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APRIL/MAY 1990
VOLUME 9, NUMBER 1
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(see page 26)

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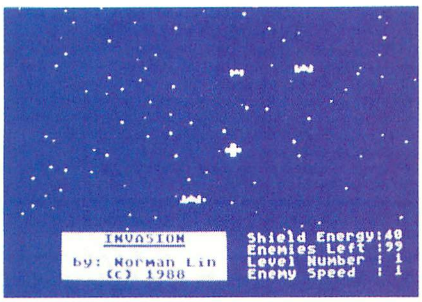
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The **Black Box** is a device for your XL or 130XE computer that adds tremendous power to your 8-bit Atari. It has two buttons, two switches, and a set of dip switches visible from the outside. It plugs directly into the back of the 600XL, 800XL, and 130XE computers. Custom cases may be an optional expense. The **Black Box** performs three main tasks: interface to a SASI/SCSI bus device (hard disks), Parallel printer port, and a RS232 port. A fourth option, available soon, will be a floppy disk port, especially useful to XF-551 owners. The SASI/SCSI port provides the necessary signals for hooking up most common hard disks. You may partition your hard disk into as many drives as you wish; up to 9 can be accessed at at time. By pressing one of the buttons on the **Black Box**, you will enter the configuration menu, where you can re-assign drive numbers, etc. When you exit, you will be right back in the program you were running when the switch was pressed. Each hard disk can be write-protected. The Parallel Printer port will allow you to hook up any printer that uses the standard Centronics interface. As an option, you can use the computer's extra memory as a printer buffer, or order the **Black Box** with 64K of on-board RAM. You may assign printer number and line-feed options within the menu (for use with multiple printers). Another amazing feature of the **Black Box** is the built-in screen dump. By pressing a button (on the box), the contents of your screen will be dumped to your printer (you can define text or graphics modes with a switch)! The RS232 port supplies the full RS232 spec signals for connection to a modem, or another machine (for null-modeming). The handler for the **Black Box**' s modem port is built in and takes up NO memory! The port handles rates up to TRUE 19.2K BAUD! A future upgrade for the **Black Box** is a floppy disk interface board. This will allow the addition of up to four 5.25" or 3.5" mixtures of floppy drives to be used with the system. The drives will act like standard single/enhanced/double density disk drives, but MUCH faster! All drives will be Super Archiver compatible, and support up to 2 sides of 80 tracks. Along with this hardware upgrade will come software capable of reading, writing, and formatting disks in IBM's MS-DOS format and the Atari ST format, and allow you to transfer files between those disk formats and the Atari's format. In addition , a machine language monitor has been added to allow memory disassembly, memory/register changes, and more. The Price of the **Black Box** is $199.95 for the basic unit and $249.95 with 64K of RAM (for printer spooler) plus $8 for S/H/I. An optional custom **BLACK BOX** case is available for $39.95 extra.

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(for 800XL'S and 130XE's only)

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- Built-in floppy/disk configuration editor (1-9)
- Built in **RAMDISK** configuration editor (1-9)
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Easy to use, very **powerful**, and **NO ADDITIONAL HARDWARE** required! Works with TV or Monitor! This "**DISK ONLY**" 80 Column Word-Processor is simple to use while offering numerous features such as:

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The Super Archiver **"BIT-WRITER"!** is capable of duplicating even the "uncopyable" EA and SYN series which employ 34 FULL sectors/track. The **"BIT-WRITER"!** is capable of reproducing these and **FUTURE** protection schemes of non-physically damaged disks. Simple installation... **PLUG-IN** circuit board and 4 simple solder connections. The **"SUPER ARCHIVER"** with the **"BIT-WRITER"!** is the ultimate **PROGRAMMING/COPYING** device for Atari 1050's. **EXACT DUPLICATES** of originals are made! Copies run an **ANY** drive. Must be used with Super Archiver. Only $79.95 plus $5 S/H/I.

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The **"QUINTOPUS"!** is an inexpensive device that provides a tremendous amount of convenience while eliminating the problems associated with the endless "daisy-chaining" of peripherals (eg: drives, interfaces, printers, modems, cassettes, etc.). The **"QUINTOPUS"!** is an I/O port expander that converts a single I/O output/input into five additional outputs/inputs. Instead of daisy-chaining all your peripherals (which often times results in passing a signal through 30 feet or more of cable!), the **"QUINTOPUS"!** allows each device to be connected directly to the computers through only three or four feet of cable. This is particularly useful when attempting to use **ULTRASPEED** or **WARPSPEED** data transfer rates. The **"QUINTOPUS"!** also provides the "extra" I/O ports often needed to connect devices not having daisy-chaining capabilities. Cable resistance and compacitance are greatly reduced thereby significantly improving the opportunity of accurate data transfers! Only $39.95 plus $5 S/H/I. SIO cable is $5 extra if needed.

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This Deluxe version of the **"QUINTOPUS!"** has all of the above features with the additional benefits of two **SWITCHABLE PORTS!** This means you can connect two computers to one printer or two printers to one computer; you can switch in a computer/printer combination and while you're printing out a long document, switch in a second computer to access a modem, disk drive, cassette deck, etc! Switch multiple combinations of peripherals or computers without the hassle or re-arranging I/O cables...simply flip a switch! Only $59.95 plus $5 S/H/I. SIO cable is $5 extra if needed.

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COMPLETE Hard Drive Systems from C.S.S. include the **BLACK BOX**, power supply, logic board, controller, DOS, cables and assorted software! All systems are wired, preformatted and have sample programs on them. Simply take it out of the box, plug it in and **BOOT**....no hassles! We currently stock 5 MEG to 80 MEG systems ranging from $495 to $895. Sizes range from 3 1/2 inch, 5 1/4 inch, to 8 inch industrial quality. Call!

Controllers available separately from Xebec, Adaptec, Seagate, Konan, and Western Digital. Call for pricing.

SPECIAL-SPECIAL! 5 MEG REMOVABLE disk Hard Drive — BRAND NEW — only $495 complete! Hard Drive sold separately in limited quantities for only $99.95. Excellent for backing up larger HD systems! (Original drive cost was $1100!)

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These specials are available on a first come first served basis. Pre-owned items are in exceptionally clean condition and are in perfect operating order. All items are warrantied. Sorry ... no rainchecks. Order 5 or more items and we'll pay the freight. These SPECIALS are for C.S.S. customers only - NO DEALER DISCOUNTS! Add $5 to order for S/H/I.

	NORMALLY	LIMITED SPECIAL
1. 130XE with 320K POWER PLUS upgrade and Ultra Speed Plus installed (with power supply and cable)		$ 250
2. 1050 DISK DRIVES with SUPER ARCHIVER II and SILENCER installed (with power supply and cable)		$ 250
3. SUPER PILL (without case)	$ 80	$ 22
4. ULTRA MENU/DOS	$ 30	$ 19
5. DISKCRACKER (Newest version)	$ 50	$ 19
6. ELECTRONIC PHANTOM SECTOR MAKER DELUXE	$ 60	$ 35
7. IMPOSSIBLE for 800 or 800XL	$ 150	$ 69
8. KLONE II (Generic HAPPY Backup)	$ 100	$ 75
9. SILENCER	$ 30	$ 19
10. BLACK PATCH (MASTER)	$ 50	$ 25

REPAIRS

For 24-48 hour repair service on Atari computers or drives, call our repair department at (716) 586-5545 day or night. All work is guaranteed, NO minimum estimate fees; if you have two or more items for repair and don't want to spend any money .... send them to us and we'll use the parts from both defective items to make one good working unit at NO CHARGE ... we'll keep the other defective item for parts!

EDITORIAL



I would like to commend you on your decision to continue publishing Antic Magazine. Like many others, you are probably feeling a tremendous amount of economic pressure to stop supporting the 8-bit Atari computers — just as I am feeling pressure to move to a 16-bit computer. As long as you continue to publish Antic, I feel I can continue to resist.

I have been using an 8-bit Atari since the early 1980s. I bought it for its entertainment value, as well as for its more practical capabilities. I feel that my personal and family computer demands will never be too much for the Atari. And I hope that both Antic and my 8-bit will age gracefully into the distant future.

Joseph Chiko
Darien, IL

This much-appreciated letter from Mr. Chiko is fairly typical of many reader communications **Antic** has received in recent months. We have gotten used to hesitant phone voices saying breathlessly, "Oh, you're still here! Is **Antic** going to continue? I've been hearing these rumors..."

Well, despite any confusing rumors while readers got used to **Antic**'s new every-second-month publishing schedule, we are still hard at work supporting the great classic Atari 8-bit personal computers.

You see, unlike the big corporations and publishing conglomerates that shut down their Atari publications, Antic Publishing Inc. is not run by bean-counters who don't really care about individual readers. Because we don't have a huge corporate overhead to pay for, we are willing and able to keep putting out **Antic** Magazine plus Disk even if it only makes a small profit.

There will be an **Antic** just as long as enough enthusiastic Atari 8-bit users are still out there to support the magazine. And recently there have been some encouraging surprises. For example, in this issue you'll even find some new advertisers offering 8-bit products. Also, the Antic Software Grab-Bag discount offer has also been a big success and will continue.

Our Super Disk Bonus software is becoming more complex and ambitious too. The Antic Disk remains your best regular source of new 8-bit programs. Some of the exciting, powerful 8-bit software you'll find on upcoming Antic Disks includes — Minature Golf Plus (a former commercial release), a new desktop publishing program and fancy fonts, a vast sequel to the original Text Adventure game, new programs from the author of Antic Music processor, an exclusive add-on module for Atari BASIC, a player design editor in fast machine language, and much more.

There's no doubt that **Antic** must move towards becoming primarily a magazine for disk subscribers. So don't risk not finding your **Antic** at a convenient newsstand — subscribe now and tell your Atarian friends to subscribe too. Support **Antic** advertisers and be sure to tell them you're buying because you saw it in **Antic**. If you want the many more years of use that your 8-bit Atari is capable of, it's up to you to help **Antic** keep up the good work.

Nat Friedland

Nat Friedland
Editor, **Antic**

1050 Belts

Here at Cottonwood Computers, we would like to offer assistance to the I/O writer in the February/March 1990 issue who was looking for drive belts for an Atari 1050. We have a few 1050 drive belts in stock, at $5 apiece. We can be reached from 9 am to 5 pm Pacific Time, Mondays through Fridays, at the address below.

Stacey Ristagno
Cottonwood Computers
P.O. Box 818
Cottonwood, CA 96002
(916) 347-0416

Another helpful reader called to say that he'd managed to get a replacement belt from Computerland — the belt was actually designed for an older IBM drive, but has worked fine with the 1050 since. Also, Best Electronics carries many parts for Atari products, including belts for those older drives. In fact, according to Best, they carry belts for two different versions of the 1050 drive, the Tandon ($4.50) and World Storage ($6.75) drives. Best Electronics is at 2021 The Alameda, Suite 290, San Jose, CA 95126. (408) 243-6950. — ANTIC ED

Sound Advice

It's a shame that you've gone bimonthly, but the December/January disk showed you still have good programs. *Naval Battle* was excellently programmed — and a lot of fun. Your *Sound Creator* is excellent — so how about telling us how to use it in our own programs, or having someone send in a synthesizer?

Also, there are a few errors in *Sound Creator* which are very annoying. If you make a mistake when typing the filename while loading or saving, you will get an error message. Worse, you can't save your waveform, and have to reboot to load a new one. To correct this, you need to add CLOSE #2 to lines 5900 and 6900, as follows:

```
5900 PRINT "Error in Save" :FOR
I=1 TO 100 :NEXT I :TRAP 40000
:CLOSE #2:GOTO 1020
6900 PRINT "Error in Load" :FOR
I=1 TO 100 :NEXT I :TRAP 40000
:CLOSE #2:GOTO 1020
```

If the file is too short (say you accidentally press [RETURN] or something) the program will crash. To prevent this, just add a TRAP 1020 at lines 5001 and 6001.

Michael Shawstad
Moorhead, MN

Epson Not Required

The *Antic Numerologist* in your December 1989/January 1990 issue does not require an Epson-compatible printer for hard copies. It works rather well on a direct-connect Atari 1020 printer/plotter — in as many as four colors. It also works on a direct-connect Okimate 10 printer which simulates the Atari 1025 printer. And, by deleting some of the ? #1 statements in the program (without changing any line numbers), you can also print in 80 columns.

Michael Pascarelli
Port Richey, FL 34668

First Factorials

When my daughter asked me a question about factorials, I thought I'd try to get the computer to do them in BASIC. You see, I'm not very proficient at programming — I like to putter around in BASIC, but I'm not likely to ever do more than write some simple spaghetti code. But, after some frustration, I did get the loop right and can produce a factorial.

A factorial is a number times one less than itself times two less ... times one. For example, five factorial (written 5!) is 5*4*3*2*1 = 120. My code goes like this:

```
5   DIM A$(1)
10  ? "Pick a positive integer."
20  INPUT P
30  A=0:C=1
40  FOR I=1 to P
50  A=A+1
60  C=C*A
70  NEXT I
80  ? P;" Factorial is ";C
90 ? "Want another? (Y/N)"
100 INPUT A$
110 IF A$="Y" THEN GOTO 10:
END
```

The highest number you can enter before the answer starts coming out in scientific notation is 13!, or 6,227,020,800. Above 68!, the result will be an ERROR 11 Numeric Overflow message. If you wanted to get fancy, of course, you could add some error trapping, and maybe use the routine in a more involved program.

Perhaps this is old stuff, too easy for a lot of programmers, but I'd never seen it before and was proud to have come up with it. At least I enjoyed myself this evening.

Richard Williams
Pullman, WA

WEFAX Kudos

I have just completed the WE-

FAX decoder project that you published in the September, 1986 issue and I want to say that it works very well. I enjoy using it tremendously. The maps that I receive are very clear and I find them fascinating.

For the benefit of your new readers, WEFAX are facsimile transmissions on shortwave radio frequencies of weather maps and information (among other things). Next, I am going to search for an RTTY or Baudot deocder so I can decode some of the text that is also available on shortwave.

Eric Anderson
Dover, DE

For other readers who may still want to try this fascinating project, be aware that one essential part — the XR2211 chip — is no longer available from Radio Shack. Other sources that should carry the chip include:

JDR Microdevices, 1224 S. Bascom Avenue, San Jose, CA 95128. (800) 538-5000, (800) 662-6279 in California.

Jameco, 1355 Shoreway Road, Belmont, CA 94002. (415) 592-8097.

Radar Electric, 168 Western Avenue W., Seattle, WA 94086.

***Antic** welcomes your feedback, but we regret that the large volume of mail makes it impossible for the Editors to reply to everyone. Although we do respond to as much reader correspondence as time permits, our highest priority must be to publish I/O answers to questions that are meaningful to a substantial number of readers.*

Send Letters to: ***Antic I/O Board, 544 Second Street, San Francisco, CA 94107.***

DAISY-DOT III

(desktop publishing)
Roy Goldman
2440 S. Jasmine
Denver, CO 80222
Requires minimum 48K memory, graphics printer
(no price at press time)

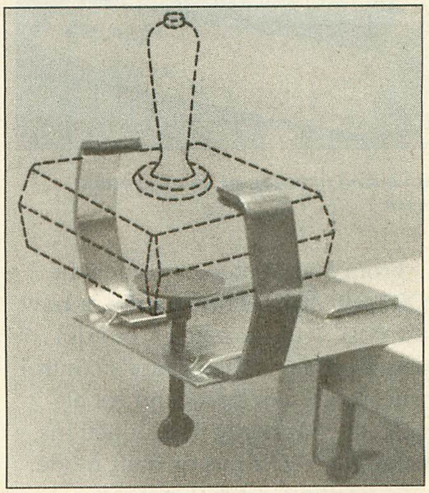
Daisy-Dot III brings new power to 9-pin dot matrix printers. Though still giving users the high-quality proportional text output of the original Daisy-Dot and Daisy-Dot II, Daisy-Dot III now adds a new text managing system. The original programs required text to be pre-formatted ("printed to disk") with a word processor, but Daisy-Dot III will take simple "saved" text files and let you control all text formatting such as margins, word wrap, line spacing, page breaks and tabs. Many of the useful features from Daisy-Dot II are still available, of course, such as centering, justification, underlining, and the ability to change fonts at any point.

In addition, a new font format allows characters to be up to 32 X 32 dots in size (as compared to the original 19 X 16 matrix) allowing for greater detail and improved definition. All fonts can be magnified both horizontally and vertically, great for headlines and special efects. Two programs to help you manipulate fonts are also included. The font editor has new features such as automatic lines, circle and boxes. The font utilities package lets you italicize fonts, convert Atari screen Fonts to Daisy-Dot III format, and makes the magnified versions of fonts.

Daisy-Dot III supports all graphics-compatible Epson 9-pin printers and true compatibles, the Atari XMM801, and more. For more information and details, send a self-addressed stamped envelope to the above address.

STIK-GRIPPER

(joystick accessory)
Duggan DeZign Inc.
300 Quaker Lane, Suite #7
West Warwick, RI 02886
(800) 843-1223 (orders)
(401) 826-2961
$18.95, joystick required

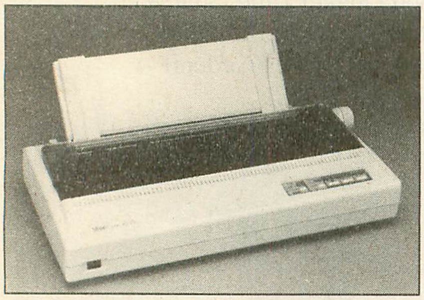


Anchor your joystick for hot and heavy action.

From Duggan DeZign comes STIK-GRIPPER, a solid steel joystick clamp designed to let hard-driving joystick jockeys operate any joystick with only one hand. The clamp adjusts to fit a wide variety of joysticks, and gives them that rock-solid arcade feel. It's particularly useful for games that require both joystick and keyboard control, such as flight simulators. The all-steel construction makes STIK-GRIPPER tough enough for really rugged play, while protective non-skid pads and caps protect your table top and joystick. And parents — with STIK-GRIPPER you'll never have to worry about your kids pulling the computer off the table by the joystick cord!

STAR NX-1500 MULTI-FONT

(printer)
Star Micronics
200 Park Avenue, Suite 3510
New York, NY 10166
(212) 986-6770
$529, interface required



Advanced printing at an affordable price.

From Star Micronics comes the **NX-1500 Multi-Font** printer, a new low-cost, wide-carriage 9-pin dot matrix printer. The printer's control panel lets users select and set almost all commonly used functions, including NLQ fonts or draft mode, italic printing, pitch, typeface, micro-feed, top of form and buffer clear. The four resident fonts — Courier, Sanserif, Orator I and Orator II — can be printed in pica, elite, condensed pica, condensed elite, and proportional sizes. The printer also features advanced paper handling capabilities, including paper park, bottom feed and an optional pull tractor. A 16K buffer is standard. In addition, Star claims that it's "the quietest printer in its price/performance category."

AVUE

(language & hardware)
EXIT
P.O. Box 25251
Washington, DC 20007
(202) RAM-9090
$30

Tired of that old, slow, Atari BASIC? Now **AVUE** (Analog Visual Utility Environment) gives you Pather, a new language 70 times faster than Atari BASIC. More, this fourth generational language has "self-programming" capabilities and requires little programming knowledge to use. Compact source code and reconfigurable object code save on memory as well.

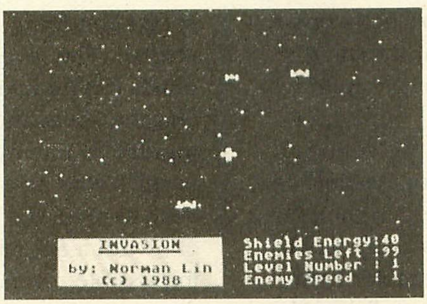
Additional hardware enhancements expand your 8-bit's abilities even further. An easy-to-install audio patch cord ($15 extra) plugs into joystick port 0 and connects to your stereo speaker lines at the other end. AVUE's Audio demo programs can give you a light show, adjusting your screen graphics to the stereo volume. Other possibilities include 20 voices on your 8-bit, drum-pad joysticks, or a variety of computerized controllers. Special introductory offer for Antic readers — $25 through June 15, 1990. For more information, send $3 for a catalog plus sample game disk. ▲

*New Products notices are compiled by the **Antic** staff from information provided by the products' manufacturers. **Antic** welcomes such submissions, but assumes no responsibility for the accuracy of these notices or the performance of the products listed.*

Starfield Invasion

Fast-action game featuring a spectacular graphics technique

By Norman Lin



Experience the 3-D thrills of this alien Invasion — and learn how its spectacular starfield display works. The BASIC type-in loader will produce a machine language version of Starfield Invasion that runs on any 8-bit Atari computer with disk drive or cassette. Assembly language programmers can examine the Invasion source code on this issue's Antic Disk as an extra bonus.

Unquestionably, computer graphics have improved remarkably over the past few years. New 16-bit computers clearly have more graphics capabilities than the first 8-bit Atari. This is not to say, however, that impressive displays cannot be produced on our old 8-bits. In fact, the Atari's unique capability for easily accessed Display List Interrupts can create striking screens, even by today's standards. The accompanying game program, Invasion, utilizes the Atari's powerful DLI capability to create a realistic 3-D starfield.

Type in INVASION.BAS, Listing 1, check it with TYPO II, SAVE it to disk, then RUN it. You will be asked whether you want to put the program on Disk or Cassette. Type [D] for disk and press [RETURN]. At the prompt, put a freshly formatted disk with DOS 2 or 2.5 on it into drive 1. When you press [RETURN], the Invasion machine code will be created and saved on disk in an AUTORUN.SYS file. When the disk drive stops whirring and the program signals you that it has finished, you're ready to boot with the new disk in drive 1. Turn off your computer and remove all car-

tridges (XL/XE users hold down [OPTION]), and turn on your computer again. Invasion will automatically load and run. Disk users do not need to type in Listing 2.

Antic Disk Users: The machine language version of Starfield Invasion is on disk as INVASION.OBJ. To RUN this version, go to DOS and use DOS command C to copy the file onto another disk with Atari DOS 2.0 on it. (Users with only one drive use DOS command O to copy the file.) Rename the file AUTORUN.SYS, put the disk in drive 1, turn off your computer, remove all cartridges (XL/XE users hold down [OPTION]), and turn the computer on. The program should load and run automatically.

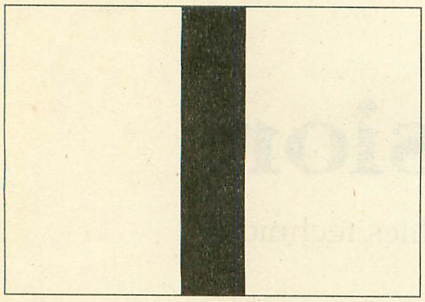


FIGURE 1 Screen with Player Band

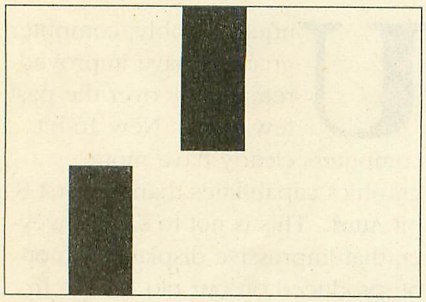


FIGURE 2 Screen with Player Band and DLI

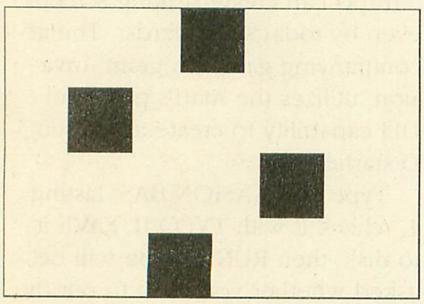


FIGURE 3 Screen with Player Band and Three DLIs

Cassette users also type in Listing 1, INVASION.BAS, checking it with TYPO II. Save this program to cassette, then RUN it, and at the prompt respond that you wish to create a cassette. Then follow the instructions onscreen. Place a cassette into the recorder, position it, and press [RECORD] and [PLAY]. Note the counter number. After you press [RETURN], the program will write the Invasion machine code to the cassette. When the recorder stops, rewind the cassette back to the counter number you noted earlier. Then type NEW and press [RETURN]. Next, type in Listing 2, CASLOADR.BAS, and RUN it. When the program prompts you to do so, press [PLAY] and then [RETURN]. The Invasion program will load and run.

For programmers, we've included the source code for Starfield Invasion on disk as well, in the file INVASION.SRC. This code was created with Atari's Assembler Editor cartridge and stored on disk with the LIST command.

(Author Lin provided custom loaders for Starfield Invasion that appear to work fine. But we don't have the equipment to test for every possible hardware configuration.— ANTIC ED)

The Game

You are aboard a space ship, having just finished a routine mission. You are traveling back to your home planet for a nice, long rest. All of a sudden, several fighter ships pop out of nowhere and begin attacking you! Monitoring their radio transmissions, you gather that their mission is to conquer your home planet and use it as an outpost for their fiendish plots. Yours is the only ship in the region which can hope to stop this onslaught.

You must repel the enemy invasion forces by destroying all, or as many as possible, of the 99 ships in the attacking fleet. You do this by utilizing your high-energy, tightly-focused laser beam, aimed by means of a joystick-controlled crosshair and activated by depressing the fire button. The enemy ships, though, move in erratic patterns, making them difficult targets. In addition, the invaders fire at you and drain your shield energy by two units every time they hit you. You gain one shield energy unit each time you destroy an enemy, however. If your shield energy ever drops below zero, you are destroyed and the invaders succeed in overtaking your home planet.

You can alter your enemies' speed and firing rate at the title screen. The level number determines the frequency of enemy fire, and the speed factor controls the rapidity of enemy movements. On Level 1 with a Speed of 1, it is quite easy to repel the invaders. On Level 3 with a Speed of 3, it is nearly impossible. No score is kept, but the more enemies you repel, the better.

Technical Details

The most striking aspect of this game is clearly the 3-D starfield. It adds a tremendous amount of depth to the display. To understand how this works, it is first necessary to understand how the screen is created.

To create an image on the screen of your television set, an electron gun sends a beam sweeping sideways across the screen. Then the gun is deactivated briefly, reset back to the beginning of the next line, and sweeps back again, creating the next line. This process continues until the beam reaches the bottom of the screen. Then the screen is blanked and the process begins again at the top.

When the beam reaches the bot-

tom of the screen, a special thing happens — the Vertical Blank Interrupt, or VBI, named for the momentary screen "blanking" that occurs during this period. On your computer, the VBI is an Operating System routine that actually *stops* the computer in the middle of what it is doing, takes care of "housekeeping" operations (such as updating shadow registers and other miscellaneous information) and then re-starts the computer back where it was before the VBI.

Interrupts, however, don't have to occur only at the bottom of the screen. We can create an interrupt anywhere we want to onscreen, and at that *specific* point on the screen, the computer will stop, do the interrupt, then continue its operations. This is a Display List Interrupt, or DLI.

The advantage of the DLI is that by stopping the computer at a specific point on the screen, we can then change the screen from that point on, while leaving the screen before our DLI unchanged. In *Figure 1* we just have a player band stretching the height of the screen. Now, if we set up a DLI in the middle of the screen and use this DLI to move the player band by changing its horizontal position register, then we get *Figure 2*. In effect, we have two players. Each half is individually controllable because the DLI is only changing the screen after our specific point.

This can be taken further. In *Figure 3* we have three DLIs. The top one-fourth of the screen is normal. The next one-fourth is controlled by the first DLI and has its own independent horizontal position. The next one-fourth is controlled by the next DLI, and has its own horizontal position, as does the last one-fourth. And remember, this is all coming out of *one* player band.

The Starfield

The starfield uses one missile (missile 3) and the equivalent of 192 DLIs (actually it's one DLI executed on 192 lines) to create 192 individually controllable stars. The starfield's DLI, in addition to making each star individually movable, also makes each eighth star the same luminance. This produces eight "layers" of 24 stars each — a layer being defined as all stars of a particular luminance.

Now we move each layer at a different speed, the brightest layer the fastest, and the darkest layer the slowest. This is done with a routine which "hooks into" the OS VBI (by means of the VBI vectors at $0222-$0225). The starfield's VBI keeps track of eight counters, one for each layer. Every time the VBI is accessed (every time the electron gun reaches the bottom of the screen, which is every 1/60th of a second), each counter is decreased by one. Whenever a counter reaches zero, it is reset (counter 1 is reset to 1, counter 8 is reset to 8. This makes each counter reach zero at different, but regular, intervals) and the corresponding layer of stars is moved.

That's how the starfield works, in theory. If you study the source code on this issue's Antic Disk as INVASION.SRC, you may notice some strange sections in the starfield's DLI and VBI.

You will notice first that the DLI code is not explicitly stated in the source code. This is because, as stated earlier, the DLI is one humongous DLI that re-executes itself on 192 scan lines. So, I had 192 sets of instructions, each set positioning and coloring each star. So, rather than burdening you with typing 192 sets of almost identical code, the program enters this section of code into memory.

A DLI is a tricky thing. It *must* complete its operation before the electron gun finishes a line and starts drawing the next. That is *very* little time. If I used a loop, on each line I would need to check to see if the loop had finished, which consumes 10 machine cycles — too much, and over 192 lines that's 1,920 machine cycles wasted. By making the code repetitive, I saved 1920 machine cycles, and thus the DLI can finish on each line before the electron gun begins to draw the next line.

Similarly, the VBI routine, to move a layer of stars, does a JSR to the DECS subroutine. The DECS subroutine must move 24 stars. But, again for timing reasons, DECS could not be made into a loop. So, to avoid the tedium of typing in repetitive code, the computer creates this subroutine as well.

A final quirk that you may notice is in the initialization code. I used a countdown timer routine (which is just like a VBI) to set up the VBI vectors. I couldn't just set up the VBI vectors manually in the main code, because if an interrupt happened to occur when I had changed one byte of the VBI vector but not the other, the computer would go off to some unknown address, which could crash the program. By changing the interrupt vectors within an actual interrupt, I could be sure that no interrupts would occur during the vector changing.

If you're an advanced programmer, you may wonder why I didn't just use the built-in OS routine at $E45C to set the VBI vectors. The reason is that when I'm using the Atari Assembler Editor cartridge, deferred VBI's can't be set up — the $E45C routine simply doesn't change the vectors (I don't know why). Since the program used deferred VBIs, I had to set up the vectors through a countdown timer routine.

Enemy Movements

The rest of the program is fairly straightforward. Another VBI controls your crosshair and the ene-

mies' movements, and a countdown timer routine (which is just like a VBI) takes care of miscellaneous things such as pulsing your laser beam, turning off explosion sounds, etc. The main game routine checks if you're pressing fire, and if you are, it draws and erases your laser, then checks if any enemies were hit. If enemies were hit, they're blown up and subtracted from the remaining enemy counter, and you receive extra shield energy for each enemy destroyed. If the enemy counter is zero, you win.

If the enemy counter is not zero, then the enemies get a chance to fire. The probability for their firing was chosen by your selection of level on the title screen. If they fire, their laser is drawn and erased, and your shield is decreased. If your shield drops below zero, you lose.

As stated earlier, the enemies' movements are controlled in a VBI routine. The theory behind the movements themselves is simple — the invaders move on random vectors a random number of times. Then the enemy recedes, another advances out of the stars and it begins the same vector movement process. The advancing and receding of the invaders' ships is done by repeatedly drawing a different shape into player memory, each shape a different size than the next. This gives the illusion of growing larger or smaller, and makes it appear that the invaders are advancing or receding.

You could move as many as 1,536 stars.

Studying the source code, you should be able to fully understand all the details of how the starfield and game program work. Experimentation with the starfield routine will undoubtedly produce interesting results. You may want to try to move 1,536 stars by utilizing all four players and all four missiles as stars. An amazing display could be created by incorporating vertical as well as horizontal movement into the starfield. Or you could try moving cars, planes, or clouds instead of stars. Understanding how to move objects in 3-D will allow you to create eye-catching displays and games. ▲

Listing on page 33

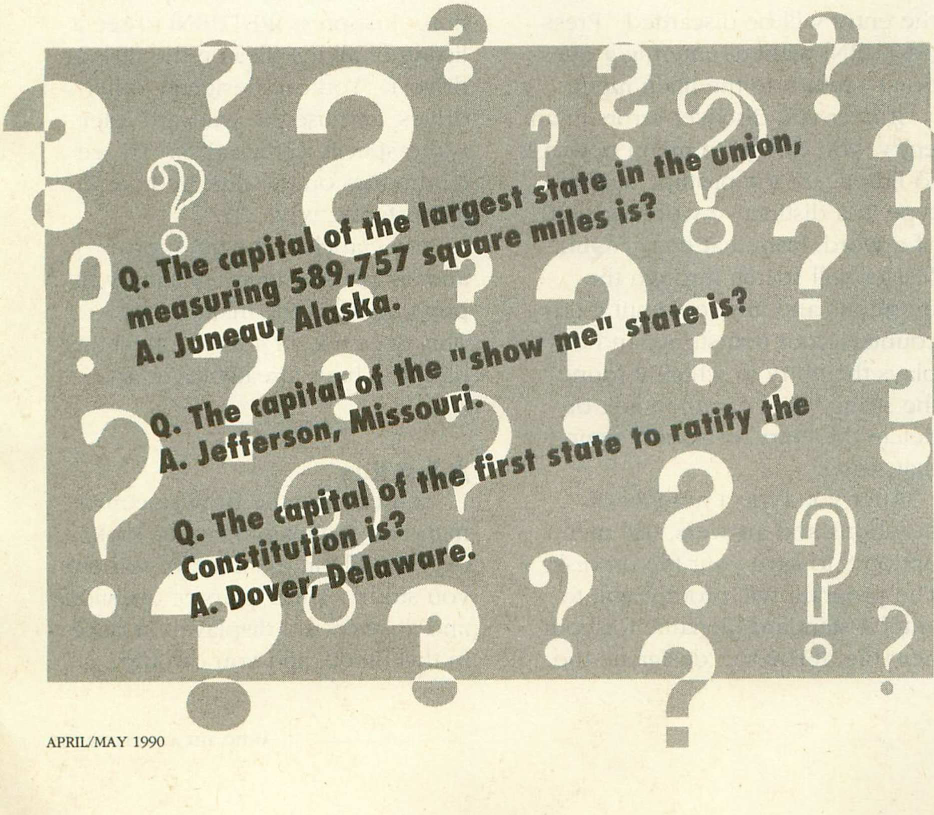
*While at high school in Jenks, Oklahoma, Norman Lin taught himself BASIC on an old Atari 400 his father bought years ago. This is his first appearance in **Antic**.*

Quiz Master

Let your Atari help you drill for those dreaded short-answer tests

By Eric Tucker

Students! Are you suffering from data overload? Are you oppressed by dread of the next quiz? Let this handy BASIC program help you practice quizzing yourself on vocabulary, dates, titles, facts — and more. Quiz Master runs on Atari 8-bit computers with at least 48K memory.



If you've found yourself struggling to memorize information, and you don't have a 24-hour emergency study partner on hand, Quiz Master can help. You can organize all your material and then test yourself without having to draft a friend or parent to read you the questions and confirm your answers. The program will even keep track of the questions that you got wrong, so you can retest yourself until you get everything right. I'm a high school Senior and I have been using Quiz Master for about two years. Since I started using it I've gotten high scores on Latin, Spanish and English vocabulary quizzes. Quite simply, Quiz Master does for quiz test preparation what word processing does for writing research papers.

Like a set of custom flashcards, Quiz Master shows you questions, and you enter the answers. Since you make up the questions and answers yourself, you can enter any kind of information to which there is only one answer. If you need a little flexibility, Quiz Master can be set to let *you* decide if your answers are right. Or, for those vocabulary tests or multiplication tables, you can set Quiz Master to accept only the exact answer.

You type in the questions and answers yourself, and the program

gives you two full lines for both. The extra room makes it easy to enter complex questions and answers. For example, Art History students could enter a title for the question, and list the artist, style, country and date for the answer. However, if you want Quiz Master to check your answers for you, it's best to keep things simple! You can also have Quiz Master give the answers, and you type the questions — particularly handy for foreign language students.

For a little flexibility, Quiz Master can be set to let you decide if the answers are right.

Getting Started

Type Listing 1, QUIZZER.BAS, check it with TYPO II, and SAVE a copy to disk before you run it. If you have trouble typing the special characters in lines 30 through 80, don't type these lines. Instead, type in Listing 2. When RUN, this program creates these hard-to-type lines and stores them in a file called LINES.LST. To merge the two programs, type NEW, then LOAD "D:QUIZZER.BAS" and then ENTER "D:LINES.LST". Be sure to SAVE the completed version of the program.

Antic Disk users should copy QUIZZER.BAS to another disk using DOS option C. (Users with only one drive use DOS option O, Duplicate File.) Quiz Master will RUN off the Antic Disk menu, but won't be able to SAVE the necessary quiz files to the copy-protected disk.

Using Quiz Master

When you RUN Quiz Master, a main menu appears, along with a display telling you how much of the computer's data memory is in use, how much memory is left, and how many question/answer pairs you have entered. To use Quiz Master, you first need to use option A, Add new entries.

Press [A], and the program will add your new entries to those in memory, or create a new file if none was loaded earlier. When you add an entry, you first type in the question. You can make your question a maximum of two lines, or 72 characters, long. Press [RETURN], and enter your answer the same way. The program asks you to verify that the information has been entered correctly. If the information is correct, press [Y]. If an error has been made, press [N], and the entry will be discarded. Press [RETURN] without entering a question to return to the main menu.

If later you discover errors in an entry, you can go to menu option E to Edit it. At the prompt, simply type in a distinctive word, or part of a word, from that entry. Quiz Master will search through the questions and answers until it encounters your text string, and displays the entry in which it found the string. You can then edit or delete the entry, or search again for that string.

After you type a number of questions and answers, use menu option S to save your file on disk. The program will prompt you to enter a standard filename for your new file. (You can designate the drive to which the file should be saved. If you want to save the file to drive 2, be sure to put D2: before the filename.) Quiz Master uses its own file format, so you won't be able to edit the files with a word processor.

Pressing [L] in the main menu Loads a Quiz Master file from disk. Enter the name of the file you want to load, and press [RETURN]. If you already have a file in memory, Quiz Master asks whether or not you want to erase the current file in memory (Overwrite resident file? (y/n)) before loading the new file. If you respond by pressing [N] for no, Quiz Master will load your new file and append it to the file already in memory, if there is enough room. If you want to keep separate versions of the files, make sure you first save them on disk. Once you merge two files in memory, there is no way to separate them again.

Also be careful not to load files which were not saved from Quiz Master, as the results can be unpredictable. To see a directory of the files on disk, simply press [I] for Index at the main menu. You will be prompted to enter a file specification. Just press [RETURN] to see a listing of all the files on the disk in drive 1. You can designate other drives, and use the wildcard asterisk to specify certain files. To see all the files on the disk in drive 2, for instance, type: D2:*.*.

You can clear the question-answer pairs in memory simply by pressing [C] at the main menu. This does not, of course, affect any files you have already saved to disk.

A Test Run

You can use the Browse command on the main menu to look over the file in memory, or to help you study. Three pairs of questions and answers are displayed at once in this mode, and you can flip

quickly through the whole file. The program gives you the option of having questions or answers given first, with or without "automatic answer cover," which covers over the answers whenever you move to a new question. You can quickly refresh your memory with the questions and answers both showing, or quiz yourself with the answers covered. Or, simply press the number of the question to cover or uncover its corresponding answer. In larger files, you can jump to a specific question by pressing [J] and then the number of that question. A list of commands at the bottom of the Browse screen makes it easy to remember all your options while browsing. Or, press [H] to print out a list of Browse commands. To return to the main menu, press [ESCAPE].

Once you've got your questions entered and edited to your satisfaction, you're ready to take your first test. First, however, be certain you have a copy of your file *saved on disk*. As you go through the test, the questions will be deleted from memory. The questions you missed will be automatically saved on disk, giving you a separate file of the questions you need to study the most, ready for another try.

Once you're ready to take a real test, press [T] on the main menu. Quiz Master will go through all the questions in memory, one by one, keeping track of your score as you go. Several options let you tailor the testing process. You can choose to go through the questions randomly, or in the order in which they were entered. Either the question or the answer can be given first, as the hint — a very useful option for studying foreign languages, where you need to know that "*la casa*" in Spanish means "house" in English, and vice versa.

You can also choose between having answers accepted with User approval, or Verbatim only (U or V). If you choose Verbatim, the answer has to match the one you originally entered exactly, letter for letter. You'd want to choose Verbatim for vocabulary quizzes, where spelling counts, for example. For longer, more complex questions, User approval lets *you* decide whether or not an answer is correct. (Don't cheat, now.)

I've discovered that typing in the correct answer every time can be annoyingly slow, so I usually tell the computer to accept user approved answers. When Quiz Master asks for an answer, I try to visualize the answer in my head and then press [RETURN] to see if what I thought was correct. If, however, you're going to have to reproduce long answers exactly on the actual test (quotes, or if spelling counts, etc.) then you might as well use Verbatim mode and make sure you get it right.

On the Road

Of course, your faithful 8-bit can't go everywhere with you, but you can print a list of your questions and answers for studying at school, on the bus, or wherever. Get your printer ready, then just press [P] at the main menu. You can enter a title for your list, which will be printed at the top of your list. You also have the option of printing in regular or condensed print. The questions and answers are printed on one line in two columns, and your longer entries will have their ends chopped off in order to fit. Regular print is easier to read, but limits your questions and answers to 39 characters each. Compressed print, on the other hand, gives you 65 characters each.

The print routine works with Epson-compatible printers. In particular, the control codes for boldface, underlining and condensed print might not work on other printers. If your printer requires different codes, change the data statements in lines 84-89, which contain the ASCII codes of the characters that must be sent to the printer. Lines number 84 and 85 turn boldface on and off, respectively. Lines 86 and 87 control underlining, while 88 and 89 control condensed print.

Normally, Quiz Master will show about 18K of memory free for quiz questions. If you find this limiting, and you are the proud owner of a 130XE and a BASIC XE cartridge, you can expand this memory to 30K. If you type EXTEND in direct mode while Quiz Master is loaded into memory, BASIC XE will transfer the program into the 130XE's extended memory banks, thereby freeing up the entire 32K of normal memory for data.

I suggest that you do not SAVE Quiz Master back to disk after typing EXTEND unless you will need the extra memory every time you use it. If you do, you won't be able to RUN the program without BASIC XE and extensions. Just keep the original version and type EXTEND whenever you need it.

Quiz Master's flexibility makes it highly adaptable to your studying needs. I recommend that you experiment a bit to find out what sequence of browsing, testing, retesting and printing helps you the most. Personally, I prefer to type in the data, browse through the file briefly and have Quiz Master test me once to discard all the words I'd already learned from typing them in and studying. Then, I print out the file of questions I got wrong, and take the list to school with me the next morning. As I study the list, I cross out questions I get right until there's nothing left on the list. It's worked well for me, and I hope it helps you in your studies, too!

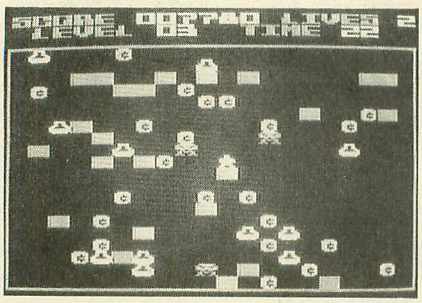
Listing on page 34

Eric Tucker lives in Washington, DC. This is his first appearance in ***Antic***.

Nuclear Reactor

Cleaning up after a meltdown can get messy

By Dennis Debro



It's a dirty job, but somebody has to do it. In this radically radioactive game, you'll never need to worry about your job security — just your life. Nuclear Reactor is a BASIC type-in game that works on 8-bit Atari computers with at least 48K memory and a joystick.

Your regular job at the local nuclear power plant seemed like such a sweet deal, getting good bucks for a little sweeping and cleaning up around the laboratories. Then came the meltdown. You escaped in time and were actually enjoying your enforced vacation, when the boss got a bright idea. As janitor, cleaning up is your responsibility, right? And there's lots of cleaning up to do after a meltdown!

Of course, your boss is a little more concerned with the valuable experiments left behind than he is with the radiation. At least he came up with mobile radiation suits to protect you. At least there's a little bonus waiting for you inside — some of the workers ran out so fast, they dropped their change, and any coins you find, you get to keep.

You're still going to have to watch your step inside the plant, where the walls and desks glow with radiation. Touch the walls or glowing obstacles in your path and you'll die. You can't even get close to the left and right walls without getting a fatal dose of radiation. To make things worse, deadly green creatures now stalk the halls, eager to eat you alive.

Getting Started

Type in Listing 1, REACTOR.BAS, check it with TYPO II and SAVE a copy to disk. If you have trouble typing the special characters in lines 90 and 130, don't type these lines. Instead, type in Listing 2. When RUN, this program creates

these hard-to-type lines and stores them in a file called LINES.LST. To merge the two programs, type NEW, then LOAD "D:REACTOR.BAS" and then ENTER "D:LINES.LST". Be sure to SAVE the completed version of the program.

When you first RUN the game, it takes a few seconds to initialize and change the character set. Then, the flashing title screen will appear. To begin play, plug in your joystick and press either [START] or the joystick's [FIRE] button. The mutant monsters, valuable coins and beakers begin to appear, scattered across the screen. Then, all the deadly radioactive materials in the room will shine briefly in rainbow colors, just before you appear in the center of the screen.

Thanks to foresighted company cutbacks, your special radiation outfit doesn't move in diagonals. It also has a limited lifespan. If your special counter reaches zero before you cleaned up the entire level, you're dead. Still, the suits are better than nothing and you'll need all three suits the company has provided. Each time you touch radioactive material, stay past the deadline, or get caught by a creature, you'll have to go back, put on a new suit, and start that level all over again.

To finish a level, you must collect all the white beakers before the deadline. When you finish a level, you receive a bonus, calculated by adding the level number to the amount of time left, and multiplying the sum by 100. You also get 100 points for every beaker you pick up, and 250 points for every coin. For every 20,000 points you get a new life — to a maximum of five.

As the levels get higher, the number of obstacles, objects to retrieve, and monsters to avoid increases. Fortunately, there's a limit of five monsters per level. Still, this job could take forever — there's no limit to the number of levels for you to clear. Making things even harder, those devious denizens of this radioactive realm have been known to eat a beaker or two, just to make it impossible to escape. At least you'll never have to worry about job security in this never-ending cleanup. ▲

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*Dennis Debro is a college student living in Birmingham, Alabama. This is his first appearance in **Antic**, and his first game written for the Atari.*

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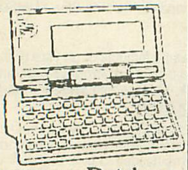
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The Gold Mine and the Princess

Strategic text adventure with sound cues

By William Austin

Dig for gold, buy a few cows and maybe win a princess in this sound-enhanced text adventure and strategy game.

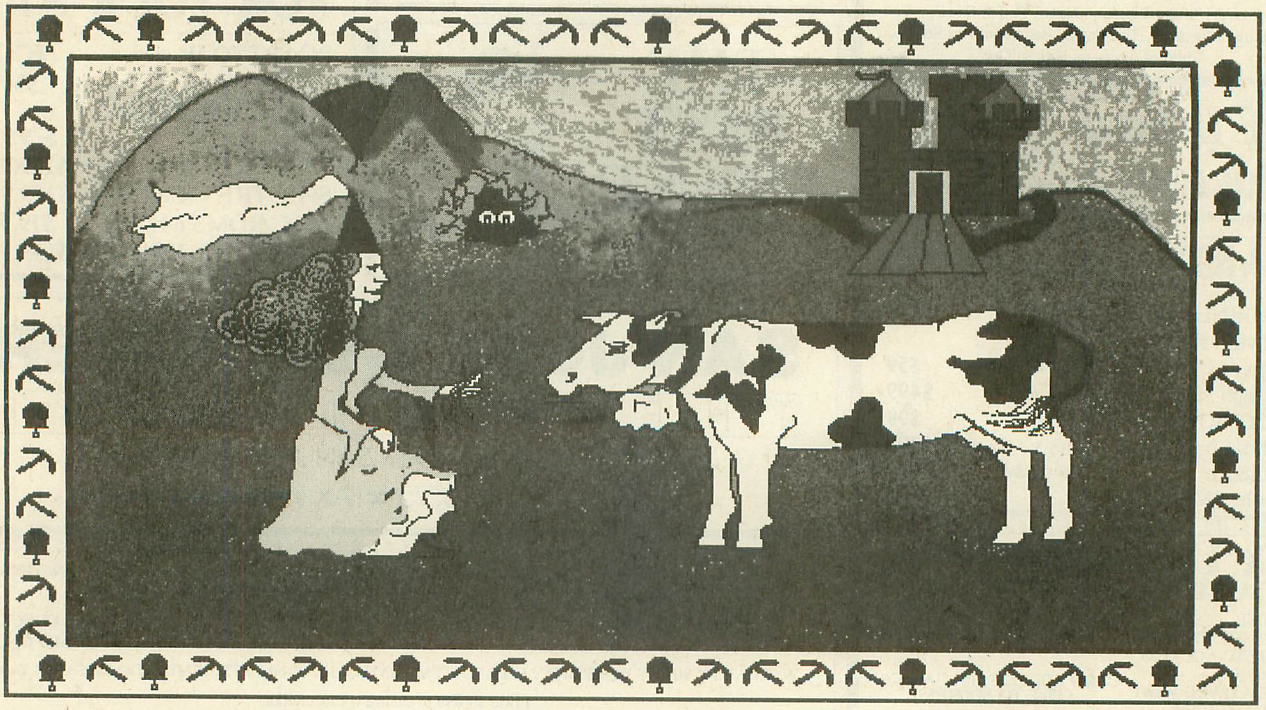


ILLUSTRATION BY WENDY JOHNSON

For this issue's *second* Super Disk Bonus, Antic presents the Gold Mine and the Princess, a complex game of magic, mine exploration, cows — and strategy. Reminiscent of the old city-planning game, Hammurabi, this Gold Mine requires you to find gold, buy cows and make a fortune so you can wed the princess you love. Magic items and deadly creatures add complexity to the basic strategy of "buy low, sell high." More, author William Austin (a full-time freelance writer from Ferndale, Michigan) makes witty use of the 8-bit's sound-effects capabilities to add atmosphere to the text descriptions of the mine. Here, you don't just see words telling you that you hear a canary — you actually hear it.

The game will run automatically from the back side of your Antic Monthly disk. Turn your computer off, put the disk in drive 1 with side B up, and turn the computer on with the BASIC cartridge installed. (XL/XE owners *don't* hold down [OPTION].) You'll find detailed instructions for the game in the HELP file on side A of the disk.

Our Story So Far...

You've been hopelessly, madly, eternally in love with the king's daughter ever since you first saw her. Unfortunately, you're only a lowly native in the impoverished village of Ferndalia. The wily king has agreed to let you wed the princess – but only if you pay an adequate dowry.

Ferndalians use cattle as the medium of exchange, so you must somehow acquire a herd large enough to satisfy the greedy king. You can buy cattle at the regular auctions, but you'll need gold. Fortunately, there's an ancient, abandoned gold mine not far from the village, with gold still waiting for the miner intrepid enough to dig it out. Unfortunately, the mine was abandoned for a very good reason — the Beast of the Deep.

No one knows if the Beast is still in the mine, but the mine is definitely dangerous, with crumbling shafts, forgotten traps and the fearsome shaft wolves living in the dark tunnels. Still, you have to go – not only do you need the gold, but the princess has declared that she will only wed the man who has the bravery, sincerity and chutzpah to toll the Bell of Wondrous Things, rumoured to be hidden within the network of caves beneath the mine itself. She also wants the diamond ring reportedly hidden in a canvas bag deep in the mine — as long as you're down there anyway you could get it, couldn't you?

To win the princess you'll need lots of luck and determination. It also wouldn't hurt to have a deep and abiding love of cows.

Gold Mine Hints

You start the game in the village, where you are presented with a menu of choices — places to go, things to do. Press the number next to the option you want. You *won't* need to press [RETURN] except to purchase cattle at the auction. Of course, since you're starting out with no money, no cattle, and nothing to offer the princess, you're pretty much limited to going to the mine. Once at the mine, just press [H] at any time to see a HELP screen with a list of possible commands.

You're essentially limited to traveling up and down through the shaft, searching for gold and

picking up the various magic items you'll encounter. You'll find some objects that are particularly useful. The Gold Beetle and Golden Pickaxe help you find gold. The Emerald Cow affects the size of your herd. A Ruby Amulet protects you from the spells of the mad Wizard, the Cat's Eye Necklace helps you avoid accidents and traps, and the Bone Ring protects you from oxygen deprivation.

You'll also find that fungi are your friends. Red fungus cures rat-bite fever – as does the lick of the (rare) friendly rat. Green fungus neutralizes poison. Eating black fungus will instantly transport you to the bottom of the caves. White fungus takes you back to the village.

Gas clouds, on the other hand, can be deadly. Green gas is poisonous, yellow gas dissolves your gold, red gas eats your oxygen, and purple gas will send you wandering aimlessly through the maze. Only if the canary perches on your shoulder will you be safe from the mysterious gas clouds.

The king gets mad if you bother him too often.

At the beginning of the game, you'll find yourself relatively weak, unable to carry much gold, or to stay long in the airless depths of the mine. The longer you play, the stronger you'll get — as long as you avoid harmful encounters. The deeper you go, the more likely you are to encounter diseased rats, bats or poisonous snakes and insects. Once you're wounded, you'll have to hurry back to the village to recuperate.

The Village

Once you find some gold, it's time to head for home. In the village you can exchange your ore for coins and then go to the auction. There you can buy or sell as many cattle your riches will allow at the going price. If you buy low and sell high, you can add to your fortune through cattle as well as in the mine.

The village also offers you the opportunity to rest, healing some injuries and lessening the effects of any poisons. Rest also reduces the effects of rat-bite fever, though it can't cure it completely. You may also inspect your herd, and determine its current market value. You'll find that while you're away your herd can multiply from births, or disappear because of rustlers or wolves.

You'll probably want to stash some of your coins in a safe place before returning to the mine. Not everyone in the village is a nice guy. Marauding thieves along the path to the mine delight in sharing your wealth, if you're careless enough to carry gold with you when you head back for more.

No matter how large your herd, the king will refuse to give you an audience until you have met the demands of the princess. Even if you have met her demands, you'll never know just how many head of cattle the king wants until you try — and the amount varies with every game you play. When you offer him your herd, he considers the current market value of the collection, not just how many head there are. It makes sense to buy cheap, but wait to make your offer until the prices are high. If you bother the king with repeated pleas to accept your cows, or insult him with too small an offering, he can become irritable.

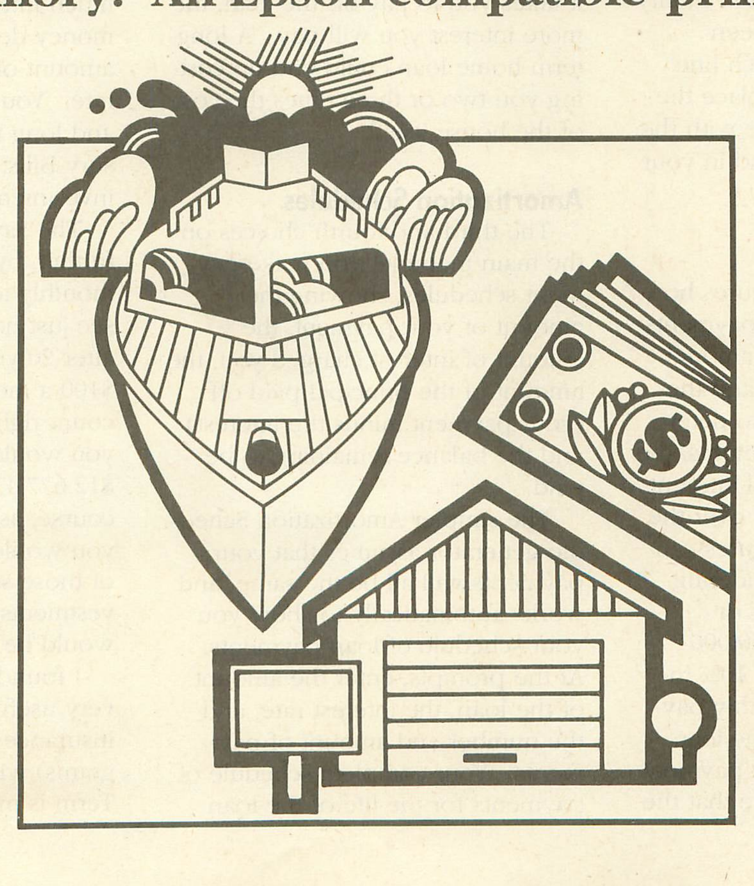
Your Antic Disk – featuring the Gold Mine and the Princess plus Antic Tournament Checkers as well as every type-in program in this issue – will be shipped to you within 24 hours after receiving your order. Just phone Toll-Free to the Antic Disk Desk at **(800) 234-7001**. The Antic Disk is only $5.95 (plus $2 for shipping and handling) on your Visa, MasterCard or American Express. Or mail a check for $7.95 (includes the shipping and handling) to Antic Disk Desk, 544 Second Street, San Francisco, CA 94107. ▲

HIGH FINANCE

Figure your payment rates the easy way

By Philip Bate, PhD

Confused by interest rates, and all those claims made by banks and auto advertisers? This simple BASIC type-in program lets you figure the interest on your loans or savings for yourself, and see the difference a few points of interest can make. Works on Atari 8-bit computers with at least 48K memory. An Epson-compatible printer optional.



Most people are understandably confused about interest rates, amortization, compounding periods, and other aspects of "high finance." Advertisements don't help, as they are essentially designed to make the transaction look as good as possible. The easiest way to gain understanding of such matters is to work out the problems for yourself. Pick a loan amount, and see what your payments would be at different interest rates, or over varying periods of time. Or set up a savings program and see what $100 a month can add up to in 10 or 20 years.

High Finance is a simple program makes working such problems easy. It even prints out complete amortization schedules for paying off a loan or mortgage. Whether at home or at the office, High Finance can help you plan your finances more knowledgeably.

Getting Started

Type in Listing 1, FINANCE.BAS, check it

with TYPO II, and SAVE a copy to disk before you RUN it.

The program uses a menu system to make figuring your finances as easy as possible. The Main Menu gives you six choices — Amount of Payment, Number of Payments, Amortization Schedule, Amortization with Varying Payments, Appreciation Schedule, and Savings Schedule. When you pick any of these choices, prompts will tell you what data to enter, and give you the option to print your results. Enter interest rates as if followed by percent signs, not as their decimal equivalents. For instance, ten percent should be entered at the prompt as 10 — *not* .10. Do not enter any commas in your dollar amounts. For example, one million should be entered as 1000000 — *not* 1,000,000.

High Finance was designed to print results on any Epson-compatible printer. If you need to modify the program for your printer, the printer subroutine is contained in lines 1310 to 1410. Plenty of REM statements have been added to tell you what each line should do, so you can replace the existing codes in each line with the corresponding codes found in your printer manual.

Amount of Payment

Amount of Payment figures how much your monthly loan payments would be. You enter the amount and duration of the loan, and the interest rate. In addition to determining your monthly payments, the program tells you the total amount of interest you would pay over the life of the loan. These figures can be very useful when considering the purchase of a new car or house. For example, a $50,000 home loan for 20 years at 10% interest would mean a monthly payment of $482.51. The same loan for 30 years would have a payment of $438.79. However, note that the interest paid for the first loan is $65,802 and $107,964 for the second. By paying a little more (only $45 a month) over a shorter period, you can save nearly $50,000 — the full amount of your original loan!

Number of Payments

The Number of Payments option lets you set the amount you can affort to pay per month, and see how long it would take to pay off your loan. This option is particularly useful for those on a fixed budget. However, if the amount of payment you enter doesn't even cover the interest charged every month, the program will give you an error message. Just as no bank will give you a never-ending loan, this program can't figure an infinite time to payoff. Try making higher payments, or use the Amount of Payment option to determine a range of workable payment amounts.

As with the previous option, you will also see the total amount of interest you would pay. The longer it takes you to pay off the loan, the more interest you will pay. A long-term home loan could end up costing you two or three times the cost of the house itself!

Amortization Schedules

The third and fourth choices on the main menu let you make payment schedules, showing the amount of your payment, the amount of interest charged you, the amount of the principal paid off (your payment minus the interest) and the balance remaining to be paid.

The simpler Amortization Schedule generator assumes that your payments will all be the same, and works automatically to show you your schedule of loan payments. At the prompts, enter the amount of the loan, the interest rate, and the number and amount of payments. Your complete schedule of payments for the life of the loan will be shown.

Amortization with Varying Payments lets you pay varying amounts. Initially, you enter the amount of the loan and the interest rate. Then, for each payment period you enter the amount you actually paid – or plan to pay. If you skip payments or pay off early, you're likely to have added penalty charges, so you can add those separately. If you make no payment or have no charges, you can just press [RETURN] to enter a zero amount.

You can use the Varying Payments option to determine how much skipping payments will cost you in the long run, or to see if paying off your loan early will save as much in interest as it costs in penalty charges.

Appreciation & Savings

If you'd rather save up for that big purchase, or want to save for your retirement, High Finance's last two features can help. The Appreciation Schedule tells you how much interest you will earn on money deposited for a certain amount of time, at a set interest rate. You can compare short-term and long term CD's, bonds, Treasury Bills, or other such one-time investments.

The Savings Schedule goes even further, by allowing you to add monthly to your savings. You can see just how much you will have after 20 years if you start putting $100 a month in your savings account right now. (At 4% interest, you would have $36,677.47, some $12,677.47 of that from interest. Of course, as a wise High Financier you would have transferred some of those savings to better paying investments, so your actual total would be considerably higher.)

I found the Savings Schedule very useful in comparing whole life insurance (and endowment programs) with term life insurance. Term is much better, *provided* that

you can invest in other things as well. If you are buying a house, for instance, put the difference between the term cost and the whole life cost into prepaying the home loan. It's usually smarter to pre-pay your mortgage rather than put your money into savings, unless you have a very low-interest mortgage, and high-yield investments. Interest on mortgages tends to be in double-digits these days, while savings accounts return only 4-6%. Whole life and endowment plans return even less than that.

A Hypothetical Case

The following example should give you a feel for the possibilities of High Finance. Let's say you own your own home with an original $50,000, 30-year mortgage at 10% interest. Your payments are $438.79 per month, and you've been paying for two years. If you plug these figures into the Amortization Schedule, you can see that your balance is now $49,414.90.

You also have a savings account at your friendly local bank, with $1,500 at 5% interest. Of course, interest on that account is compounded daily, which gives you an effectively higher annual interest rate. Or is it? The phrase "compounded daily" sounds great, but can be misleading. In this case, $1,500 at 5% simple interest for one year returns $75. With the interest compounded daily, the same amount would earn you a grand $76.90 after one year. Small interest rates, even compounded, don't return much. Still, using the Appreciation program you can see that, with $1,500 at 5% interest, compounded 365 times a year, you'd end up with $6081.86 in your account (a profit of $4581.86) after 28 years, the time remaining on your mortgage.

If you prepaid that money into your mortgage, on the other hand, you'd save on interest charges. To see how much, use the first menu option, Amount of Payment. Enter the balance and time remaining on your mortgage, or $49,414.90 at 10% for 336 months (28 years). The results show that you would pay $98,015 in interest. Next, use the Number of Payments option to see what the difference would be with a balance of only $47,914.90 – the current balance less the amount in savings. Enter $47,914.90 at 10% with a monthly payment of $438.79, and you'll see that your total interest is now only $79,773. This gives you a savings of $18,242, almost four times the $4,581.86 you'd get from the bank! Even better, you'll only be paying for 291 months instead of 336, saving almost four years of payments.

Try adding just $20 a month to your house payment and see how much you will save, and how much sooner you'll pay off that mortgage. Your own house might be your best investment. (Some banks add penalties to make up for interest lost by such repayments. Make sure you take into account any penalties for early payoff.)

Savings and Tips

You can find other ways to save money by experimenting with High Finance. For instance, try figuring out how much you pay per year on your credit card accounts, with their interest rates around 18%, or higher. Get a bank loan at 10-12% and pay off your credit cards each month, and you'll be surprised at how much money it can save you.

Now, look at the automobile market. Some of the deals being offered sound really good, until you check them out. For example, a dealer offers a $10,000 car you want, with either a $1,000 rebate, or a 4.9% loan for two years. You can borrow from the bank at 15.5% interest to buy the car outright and get the $1,000 rebate, and if you pay the loan back in two years your total interest charges will be $1,524.48. Add this to the $9,000 price of the car, and your total cost for the car is $10,524.48. Figuring the $10,000 at 4.9% for two years, your interest payments will be $518.48, for a total cost of $10,518.48. You actually save only about six dollars with the reduced interest rate, and either way your monthly payments are about $440.

Where car loans really get you is on long-term loans, like five years (60 months). The same car, financed for 60 months at 15.5% has a total cost of almost $13,000. You end up paying $4,000 in interest on a $9,000 loan, but the payments are cut in half. For all too many people in our affluent society, that's more important than the extra interest — but in the long run, all that interest hurts. Consumers should always watch out when a deal seems too good. For that matter, I suspect that to afford a $1,000 rebate, manufacturers have to jack up the price that much in the first place.

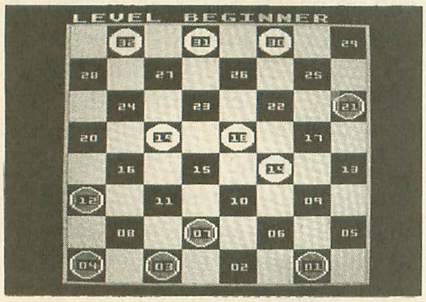
With long term loans, like mortgages, even half a percentage point in interest can make a big difference. If you need a loan, shop around carefully. Get the interest rates from the bank, and run them through High Finance to see what your interest and payments will be. With this program, it's easy for you to check the difference even a tenth of a point can make. If you've got an 8-bit Atari, you already know that you can get quality at a low price — now you can look for similar savings in the world of High Finance. ▲

Listing on page 33

Philip Bate, Ph.D. of Jupiter, Florida became an orthomolecular psychologist after working as an electronics engineer at Cape Canaveral in the 1950s. His Mighty Lister *inventory database ran in the January, 1989* ***Antic***.

TOURNAMEN

SUPER DISK BONUS





Winner of a bronze medal at the '89 Computer Olympiad

By Dave Butler

T CHECKERS

Atari checkers takes on a new, competitive edge with this prize-winning version of the classic board game. Written in fast, powerful machine language, this issue's Super Disk Bonus does not require BASIC and runs on all Atari computers with at least 32K memory.



Computer programmers from around the world gathered in London for the first Computer Olympiad, held August 9-15, 1989 at the Park Lane Hotel. Computer was pitted against computer, program against program, in such diverse mind games as backgammon, awari, bridge, chess, go, reversi, dominos and 8 X 8 draughts — better known as checkers.

Running on a "mere" 8-bit Atari, David Butler's program, Tournament Checkers, battled some impressive competition to take the bronze medal (third place) in its category. Tournament Checkers actually went undefeated through the round robin competition, suffering only two draws against the first-place and second-place programs. (First place went to the program Chinook, running on a 32-megabyte SUN 4 workstation, and developed by professor John Schafer of Alberta University in Canada. Second place went to Gil Dodgen's Checkers, running on a MAC II with 8 megabytes. Other competitors used IBM-AT and Commodore computers.)

And now Antic brings you this high-caliber checkers game, to challenge you on your 8-bit at home. Although the tournament-winning version of the program required an Atari 130XE, this special **Antic** conversion drops a few fancy touches in order to run on any Atari 8-bit computer with at least 32K memory.

There are many variations of checkers played around the world. Using the game as commonly played in the U.S. and England, Antic Tournament Checkers takes the familiar checkerboard of eight-by-eight squares. The rules will be familiar — you move your pieces across the board one diagonal square at a time, or jump diagonally over an opponent's piece to capture it. You *must* capture a piece if it is possible to do so. Reach the opposite side of the board, and your piece will be "kinged" — and gain the invaluable ability to move any distance in a diagonal direction. The first player to take all of the other player's pieces wins. With Antic Tournament Checkers, your wily Atari will give you a real challenge, so you can take a break by challenging another human in Two-Player mode.

Getting Started

You'll find Tournament Checkers on the Antic Monthly Disk in the file CHECKERS.OBJ. You can't run this machine language program from the Monthly Disk menu. Instead, go to DOS, and use option C to copy CHECKERS.OBJ onto another disk with DOS 2.0 or 2.5 on

it. (If you have only one drive, use DOS option O.) Rename the file CHECKERS.OBJ to AUTORUN.SYS. Put the disk in drive 1, turn the computer off and on again, and Tournament Checkers will run automatically.

You will be prompted to "Press trigger moving red." Either press the joystick trigger button, or press [RETURN]. (If you have two joysticks, you can set one to play white and the other to play red in Two-Player mode.) An introductory screen and some brief instructions will follow. When the game board appears onscreen, you'll be set for a one-player game at the Beginner level.

You can move your pieces in many ways. With the joystick, you move the cursor over the piece you want to move, press the joystick button to select that piece, then move the cursor to your destination square and press the joystick button again. Similarly, you can move the cursor using the [ARROW KEYS] and [RETURN].

You can also enter the numbers of the starting and ending squares, in "FROM-TO" checker notation (11-15 RETURN). Press [N], and each of the squares will be numbered. Type the number of the square on which your checker rests, a hyphen, then the number for the last square of the move — even on multiple jumps. Then press [RETURN] to make the move.

Keyboard commands give you several options. Press [H] at any time to view the instruction screens again. To restart (or give up) a game, press [B]. Press [R] to rotate the board (useful in two-player games). [T] lets you take back the last move both you and your opponent made. To watch an "instant replay" of your game, press [B] to restart, and then press [M] to replay, or [S] to step through the moves one at a time. To make the computer stop thinking in Mail Play and take its move, press [ESC].

Key combinations using [CONTROL] let you [S]ave, [L]oad and [P]rint your games. [CONTROL] [D] exits to DOS, and [CONTROL] [I] gives you an index of the files on disk. You'll find a sample game on disk. Just type [CONTROL] [L] to load it, then enter GAME1 and press [RETURN] to load the game. When a new set of checkers appears onscreen, press [B] to go back to the beginning, then press [M] to watch a replay of the game — which finishes in a head-to-head draw between two kings.

Levels & Modes

Use the [OPTION] key to change the mode from Level to Setup or Two-Player mode. In the default Level mode, press [SELECT] to change the difficulty Level, from Beginner to Hustler. There are 10 levels of play to choose from. The only real difference between levels is the length of time your Atari gets

to think about each move. Past the Junior Champion level (45 seconds per move) the game's strength does not increase substantially, but most players will find it tough enough, as is.

Antic Tournament Checkers plays according to the rules adopted by the American Checkers Federation. At most ACF tournaments, openings are drawn by cards. You and your opponent play both sides of the drawn three-move opening. There are 144 different possible openings, providing for a great deal of variety. In Antic Tournament Checkers, pressing [START] in Level mode will cause the computer to make the next move. By pressing [START] three times, you can choose a random three-move opening.

In Setup mode you can set the pieces on the board as you like. In this mode, the [SELECT] key changes the piece to deposit. With Clear Piece displayed in Setup mode, [START] clears the board.

As in most good games, winning is not easy. You'll need lots of practice to develop the necessary skills, but while you're practicing, Antic Tournament Checkers can give you many hours of fun.

Serious Gamer Notes

For more information on the American Checkers Federation, write to them at P.O. Box 365, Petal, MS 39465. They can tell you where local groups meet. Membership costs $10 per year and includes a monthly newsletter with news on checkers tournaments and games worldwide.

The First Computer Olympiad was sponsored by the Acer Group, also co-sponsors of the International Computer Go Congress. A grand prize of $1.5 million is available to the computer Go programmer who can beat a human master player without handicap on a 19 X 19 board.

*David Butler of Lake Monhegan, NY is a Class B checker player. He has co-directed eight District II Tournaments and one Northern States Tournament, and in 1987 was the overall District I champion. He has been a serious 8-bit user since 1982. This is his first appearance in **Antic**.*

Your Antic Disk – featuring Antic Tournament Checkers plus the Gold Mine and the Princess as well as every type-in program in this issue – will be shipped to you within 24 hours after receiving your order. Just phone Toll-Free to the Antic Disk Desk at (800) 234-7001. The Antic Disk is only $5.95 (plus $2 for shipping and handling) on your Visa, MasterCard or American Express. Or mail a check for $7.95 (includes the shipping and handling) to Antic Disk Desk, 544 Second Street, San Francisco, CA 94107.

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TYPING SPECIAL ATARI CHARACTERS

The Atari Special Characters and the keys you must type in order to get them are shown below:

For [CONTROL] key combination, *hold down* [CONTROL] while pressing the next key. For inverse [CONTROL] [A] through [CONTROL] [Z], press the [◪] key—or [人] on the 400/800—then *release* it before pressing the next key. (Press [◪] or [人] again to turn off inverse.) For [ESC] key combinations, press [ESC] and then *release* it before pressing the next key.

Carefully study the chart above and pay close attention to differences between lookalike characters such as the slash key's [/] and the [CONTROL] [F] symbol [◩].

NORMAL VIDEO

FOR THIS	TYPE THIS	FOR THIS	TYPE THIS
	CTRL ,		CTRL S
	CTRL A		CTRL T
	CTRL B		CTRL U
	CTRL C		CTRL V
	CTRL D		CTRL W
	CTRL E		CTRL X
	CTRL F		CTRL Y
	CTRL G		CTRL Z
	CTRL H		ESC ESC
	CTRL I		ESC CTRL −
	CTRL J		ESC CTRL =
	CTRL K		ESC CTRL +
	CTRL L		ESC CTRL *
	CTRL M		CTRL .
	CTRL N		CTRL ;
	CTRL O		SHIFT =
	CTRL P		ESC SHIFT CLEAR
	CTRL Q		ESC DELETE
	CTRL R		ESC TAB

INVERSE VIDEO

FOR THIS	TYPE THIS
	ESC SHIFT DELETE
	ESC SHIFT INSERT
	ESC CTRL TAB
	ESC SHIFT TAB
	人 CTRL .
	人 CTRL ;
	人 SHIFT =
	ESC CTRL 2
	ESC CTRL DELETE
	ESC CTRL INSERT

TYPO II AUTOMATIC PROOFREADER

TYPO II automatically proofreads **Antic**'s type-in BASIC listings. Type in the listing below and SAVE a copy to disk or cassette. Now type GOTO 32000. At the prompt, type in a single program line **without the two-letter TYPO II code at the beginning**. Then press [RETURN].

Your line will reappear at the bottom of the screen. If the TYPO II code does not match the code in the magazine, then you've mistyped your line.

To call back a previously typed line, type [*], then the line number, then [RETURN]. When the completed line appears, press [RETURN] again. This is how TYPO II proofreads itself.

To LIST your program, press [BREAK] and type LIST. To return to TYPO II, type GOTO 32000. To remove TYPO II from your program, type LIST "D:FILENAME",0,31999, then [RETURN], then NEW, then ENTER "D:FILENAME", then [RETURN]. Now you can SAVE or LIST your program to disk or cassette.

Don't type the TYPO II Codes!

```
WB 32000 REM TYPO II BY ANDY BARTON
VM 32010 REM VER. 1.0 FOR ANTIC MAGAZINE
HS 32020 CLR :DIM LINE$(120):CLOSE #2:CLO
   SE #3
BN 32030 OPEN #2,4,0,"E":OPEN #3,5,0,"E"
YC 32040 ? "↖":POSITION 11,1:? "TYPO II "

EM 32050 TRAP 32040:POSITION 2,3:? "Type
   in a program line"
HS 32060 POSITION 1,4:? " ":INPUT #2;LINE
   $:IF LINE$="" THEN POSITION 2,4:LIST B
   :GOTO 32060
XH 32070 IF LINE$(1,1)="*" THEN B=VAL(LIN
   E$(2,LEN(LINE$))):POSITION 2,4:LIST B:
   GOTO 32060
TH 32080 POSITION 2,10:? "CONT"
MF 32090 B=VAL(LINE$):POSITION 1,3:? " ";
NY 32100 POKE 842,13:STOP
CN 32110 POKE 842,12
ET 32120 ? "↖":POSITION 11,1:? " TYPO II 
   ":POSITION 2,15:LIST B
CE 32130 C=0:ANS=C
QR 32140 POSITION 2,16:INPUT #3;LINE$:IF
   LINE$="" THEN ? "LINE ";B;" DELETED":G
   OTO 32050
VV 32150 FOR D=1 TO LEN(LINE$):C=C+1:ANS=
   ANS+(C*ASC(LINE$(D,D))):NEXT D
WJ 32160 CODE=INT(ANS/676)
JW 32170 CODE=ANS-(CODE*676)
EH 32180 HCODE=INT(CODE/26)
BH 32190 LCODE=CODE-(HCODE*26)+65
HB 32200 HCODE=HCODE+65
IE 32210 POSITION 0,16:? CHR$(HCODE);CHR$
   (LCODE)
VG 32220 POSITION 2,13:? "If CODE does no
   t match press  RETURN  and edit line a
   bove.":GOTO 32050
```

HIGH FINANCE

FIGURE YOUR INTEREST RATES THE EASY WAY

Article on page 23

LISTING 1

Don't type the TYPO II Codes!

```
MN 10 REM FINANCE
NQ 20 REM BY Philip W. Bate PhD
WD 25 REM (c)1990, ANTIC PUBLISHING INC.
JN 30 CLOSE #1:OPEN #1,4,0,"K":SETCOLOR 2
   ,13,0:SETCOLOR 0,0,0:POKE 82,1
VB 40 DIM SPC$(39),MSG$(28),YEAR$(4),HEAD
   $(39),HEAD2$(39),HEAD3$(39),FINANCE$(1
   100),D$(2)
FJ 50 DIM MONEY$(10),MON$(2),AMT$(10),MNY
   $(10),I$(7),PRIN$(7),BAL$(10),LINE$(39
   ),PMT$(7),CHRG$(7)
ZE 60 SPC$=" ":SPC$(39)=" ":SPC$(2)=SPC$:
   MSG$="PRESS 'RETURN' FOR MAIN MENU"
KI 70 HEAD3$="MON  PYMNT    IN+CHGS PRIN"
UD 80 REM *** MAIN MENU***
GZ 90 A=0:N=0:P=0:MNY$="":NUM=0:PMT=0:I$=
   "":PRIN$="":BAL$="":LINE$="":PMT$=""
DJ 100 ? "■":? :? "     MAIN MENU "
ZO 110 ? :? "1 - AMOUNT OF PAYMENT"
PJ 120 ? :? "2 - NUMBER OF PAYMENTS"
KZ 130 ? :? "3 - AMORTIZATION SCHEDULE"
BT 140 ? :? "4 - AMORTIZATION W/ VARYING
   PAYMENTS"
LE 150 ? :? "5 - APPRECIATION SCHEDULE"
TQ 160 ? :? "6 - SAVINGS SCHEDULE"
CN 170 ? :? :? "    CHOOSE ONE ":GOSUB 10
   90
CZ 180 TRAP 1430:ON A-48 GOTO 190,240,290
   ,520,870,930
OC 190 REM ***PAYMENT AMOUNT***
HI 200 ? "■":GOSUB 1200:GOSUB 1220
HL 210 AMT=INT(MONEY*IN*(1/(1-(1+IN)^(-NU
   M)))*100+0.5)/100:PMT=AMT:GOSUB 1460
BO 220 ? :? :? "PAYMENTS ARE $";MNY$:? :?
   "INTEREST IS $";:AMT=PMT*NUM-MONEY:GO
   SUB 1460:? MNY$
GM 230 POSITION 4,15:? MSG$:GOSUB 1090
NX 240 REM *** NUMBER OF PAYMENTS ***
IW 250 ? "■":GOSUB 1200:GOSUB 1230
KP 260 NUM=INT(-(LOG(1-MONEY/PMT*IN))/LOG
   (IN+1)+0.9999)
AE 270 ? :? :? "NUMBER OF PAYMENTS IS ";N
   UM:? :? "INTEREST IS $";:AMT=PMT*NUM-M
   ONEY:GOSUB 1460:? MNY$
GW 280 POSITION 4,15:? MSG$:GOSUB 1090
EC 290 REM *** AMORTIZATION SCHEDULE ***
SK 300 ? "■":? "This schedule is automati
   c given the    data required below, and
   will print"
US 310 GOSUB 1170:GOSUB 1220:GOSUB 1230:G
   OSUB 1270:GOSUB 1300:GOSUB 480
IP 320 B=0:C=0:Q=0
CO 330 FOR X=MON TO NUM+MON-1
IE 340 AMT=INT((MONEY*IN)*100+0.5)/100:GO
   SUB 1460:I$=MNY$:AMT=PMT-VAL(I$):GOSUB
   1460
KD 350 PRIN$=MNY$:PRIN=VAL(PRIN$):AMT=MON
   EY-PRIN:GOSUB 1530:BAL$=MNY$
CK 360 B=B+PMT:C=C+VAL(I$):Q=Q+PRIN
DO 370 LINE$=SPC$:LINE$(1,2)=MON$:LINE$(4
   ,10)=PMT$:LINE$(12,18)=I$:LINE$(20,26)
   =PRIN$:LINE$(30,39)=BAL$
CB 380 ? LINE$;:IF P=80 THEN GOSUB 1400
YY 390 MONEY=INT(VAL(BAL$)*100+0.5)/100:M
   ON=MON+1:GOSUB 1280
ZV 400 Z=INT(MONEY*(1+IN)*100+0.5)/100:IF
   PMT>=Z THEN AMT=Z:GOSUB 1460:PMT$=MNY
   $:PMT=Z
AQ 410 IF INT(MON/13)=MON/13 THEN 430
RR 420 TRAP 80:NEXT X
BJ 430 ? :? YEAR$;" INTEREST=";C;"    PRI
   N=";Q:C=0:Q=0
GT 440 IF P=80 THEN GOSUB 1410
ZW 450 MON=1:GOSUB 1280:YEAR$=STR$(VAL(YE
   AR$)+1):X=X+1
OF 460 GOSUB 1140:GOSUB 480
OJ 470 GOTO 340
LR 480 HEAD$(1,4)=YEAR$:HEAD$(5,29)=" AMO
   RTIZATION - BALANCE= "
QR 490 HEAD2$="MON  PYMNT    INTRST  PRIN
      BALANCE"
LN 500 IF P=80 THEN GOSUB 1370
SJ 510 ? "■":? :? HEAD$;MONEY:? :? HEAD2$
   :RETURN
HJ 520 REM *** AMORTIZATION VARYING PMTS*
   **
LS 530 ? "■":? "This program is very flex
   ible as it     allows for differing pay
   ments and also for various charges."
VH 540 ? "It isn't necessary to enter a z
   ero if  no payment or charge is to be
   assessed.Simply press the RETURN."
HO 550 ? :? "INPUT STARTING YEAR (PRESS '
   RETURN' FOR 1990)";:INPUT YEAR$:IF LEN
   (YEAR$)=0 THEN YEAR$="1990"
AH 560 GOSUB 1190:GOSUB 1270:GOSUB 1300:G
   OSUB 770
EK 570 GOSUB 810:B=0:C=0:M=0:L=6
YO 580 IF PMT>=MONEY THEN CHRG$="***":PRI
   N$="***":AMT=MONEY-PMT:GOSUB 1460:BAL$
   =MNY$
SG 590 I=(INT((MONEY*IN)*100+0.5)/100):AM
   T=I+CHRG:GOSUB 1460:CHRG$=MNY$:AMT=PMT
   -VAL(CHRG$):GOSUB 1460
HK 600 PRIN$=MNY$:PRIN=VAL(PRIN$):IF PMT=
   0 THEN PRIN=-VAL(CHRG$):PRIN$=PMT$
QI 610 AMT=MONEY-PRIN:GOSUB 1530:BAL$=MNY
   $
ZI 620 B=B+PRIN:C=C+I:M=M+CHRG
ZI 630 LINE$(1,38)=SPC$:LINE$(1,2)=MON$:L
   INE$(4,10)=PMT$:LINE$(12,18)=CHRG$:LIN
   E$(20,26)=PRIN$:LINE$(29,38)=BAL$
FI 640 POSITION 1,L:? LINE$;:IF P=80 THEN
   GOSUB 1400
BR 650 IF VAL(BAL$)<0 THEN 860
WL 660 IF VAL(BAL$)=0 THEN 710
YX 670 MONEY=INT(VAL(BAL$)*100+0.5)/100:M
   ON=MON+1:GOSUB 1280
IZ 680 Z=INT((MONEY*(1+IN)+CHRG)*100+0.5)
   /100:IF PMT>=Z THEN AMT=Z:GOSUB 1460:P
   MT$=MNY$:PMT=Z
CM 690 IF INT(MON/13)=MON/13 THEN 710
EH 700 GOSUB 810:L=L+1:PRIN=0:GOTO 580
II 710 ? :? :? YEAR$;" INTEREST=";C;"
   CHARGES=";M:? "PRINCIPAL PAID= ";B
GS 720 IF P=80 THEN GOSUB 1410
SA 730 IF VAL(BAL$)<=0 THEN GOSUB 1140:GO
   TO 80
IY 740 MON=1:GOSUB 1280:YEAR$=STR$(VAL(YE
   AR$)+1)
PX 750 GOSUB 1140:GOSUB 770
QL 760 GOTO 570
PU 770 HEAD$(1,4)=YEAR$:HEAD$(5,29)=" AMO
   RTIZATION - BALANCE="
TB 780 HEAD2$="MON  PYMNT    IN/CHRG PRIN
      BALANCE"
LH 790 IF P=80 THEN GOSUB 1360
SK 800 ? "■":? :? HEAD$;MONEY:? :? HEAD2$
   :RETURN
ZJ 810 POSITION 1,22:? "ENTER PAYMENT";:I
   NPUT PMT$:IF LEN(PMT$)=0 THEN PMT=0:PM
   T$="    -    ":GOTO 830
JK 820 AMT=VAL(PMT$):GOSUB 1460:PMT$=MNY$
   :PMT=VAL(PMT$)
VZ 830 POSITION 22,22:? "CHARGES";:INPUT
   CHRG$:IF LEN(CHRG$)=0 THEN CHRG=0:GOTO
   850
OF 840 CHRG=VAL(CHRG$)
YS 850 POSITION 1,22:? SPC$;:RETURN
AS 860 ? :? "LOAN OVERPAID BY ";ABS(VAL
   (BAL$)):GOTO 710
GN 870 REM *** APPRECIATION ***
LQ 880 ? "■":GOSUB 1200:GOSUB 1250
QC 890 BAL=INT(MONEY*(1+IN)^(CP*NUM)*100+
   0.5)/100
TN 900 ? :? :? "YOUR INVESTMENT WILL BE W
   ORTH ";BAL
PJ 910 POSITION 2,22:? MSG$:GET #1,N:IF N
   =155 THEN 80
SG 920 GOTO 80
RF 930 REM *** SAVINGS SCHEDULE ***
HT 940 ? "■":GOSUB 1200:GOSUB 1230:GOSUB
   1260:GOSUB 1270:GOSUB 1300
BZ 950 B=0:C=0:IN=APR/(1200)
UP 960 GOSUB 1070
WK 970 Y=MON+NUM*12:FOR X=MON TO Y
XH 980 AMT=INT((MONEY*IN)*100+0.5)/100:GO
   SUB 1460:I$=MNY$:R=AMT:IF AMT=0 THEN I
   $="   0.00"
NK 990 AMT=MONEY+R+PMT:GOSUB 1530:BAL$=MN
   Y$:MONEY=VAL(BAL$)
BV 1000 ? " ";MON,PMT$;"  ";I$;"  ";BAL$
   :IF P=80 THEN GOSUB 1390
BF 1010 MON=MON+1:B=B+VAL(I$):C=C+PMT:IF
   MON=13 THEN MON=1:GOTO 1040
FJ 1020 IF X=Y THEN ? :? "END OF PROGRAM"
   :? MSG$:GET #1,N:GOTO 80
LH 1030 NEXT X
```

```
CC 1040 ? :? "INTEREST=";B;"  PAYMENTS=";
   C
NF 1045 IF P=80 THEN ? #4;CHR$(13);"INTER
   EST=";B;"  PAYMENTS=";C:REM TOTALS
NI 1050 GOSUB 1140:GOSUB 1070:NEXT X
UU 1060 GOSUB 1070:GOTO 1030
MR 1070 ? "[illegible]":? :? "MONTH      PAYMENT  IN
   TEREST   AMOUNT":? :IF P=80 THEN GOSUB
    1380
AX 1080 RETURN
GD 1090 REM *** PAUSE ROUTINES ***
FS 1100 GET #1,A:IF A=255 THEN 1100
IK 1110 IF A=155 THEN 80
VA 1120 IF A<48 OR A>89 THEN 1420
AK 1130 RETURN
IU 1140 POSITION 2,22:? MSG$:? " PRESS A
   NY KEY TO CONTINUE ":GET #1,N:IF N=255
    THEN 1140
NJ 1150 IF N=155 THEN 80
AT 1160 RETURN
RK 1170 REM ***INPUTS***
QB 1180 ? "[illegible]":? :? "INPUT STARTING YEAR (
   PRESS 'RETURN' FOR 1990)";:INPUT YEAR$
   :IF LEN(YEAR$)=0 THEN YEAR$="1990"
DL 1190 IF VAL(YEAR$)>2050 OR VAL(YEAR$)<
   1970 THEN 1420
AQ 1200 ? :? "ENTER STARTING MONEY AMOUNT
   ";:GOSUB 1510:MONEY$=MNY$:MONEY=VAL(MO
   NEY$)
VL 1210 ? :? "ENTER INTEREST RATE";:INPUT
    APR:IN=APR/1200:RETURN
XL 1220 ? :? "ENTER NUMBER OF PAYMENTS";:
   INPUT NUM:RETURN
NL 1230 ? :? "ENTER MONTHLY PAYMENT";
RT 1240 GOSUB 1440:PMT$=MNY$:PMT=VAL(PMT$
   ):RETURN
MM 1250 ? :? "ENTER # OF COMPOUNDING PERI
   ODS/YEAR";:INPUT CP:IN=APR/(100*CP)
HN 1260 ? :? "HOW MANY YEARS TO COMPOUND"
   ;:INPUT NUM:RETURN
YC 1270 ? :? "ENTER STARTING MONTH (1-12)
   ";:INPUT MON
FB 1280 D$=STR$(MON):IF MON<1 OR MON>13 T
   HEN 1420
RT 1290 MON$="  ":MON$(3-LEN(D$),2)=D$:RE
   TURN
FZ 1300 ? :? " HARDCOPY Y/N ":GOSUB 1090:
   IF A<>89 THEN 1350
YY 1310 REM *** PRINTER SUBROUTINE***
XZ 1320 ? "[illegible]":? :? "IF PRINTER IS READY P
   RESS  P ":GET #1,P
WP 1330 IF P<>80 THEN 1420
HD 1340 CLOSE #4:OPEN #4,8,0,"P":? #4;CHR
   $(27);"@";CHR$(27);"1";CHR$(15);CHR$(2
   7);"Q";CHR$(55)
NQ 1350 RETURN :REM ABOVE SETS PRINTER TO
    DEFAULT, SETS LEFT MARGIN AT 15 AND R
   IGHT MARGIN AT 55
AT 1360 ? #4;CHR$(13);CHR$(13):REM THIS L
   INE JUST ADDS TWO 'RETURNS'
AR 1370 ? #4;HEAD$;MONEY;CHR$(13);CHR$(13
   );HEAD2$;CHR$(13):RETURN :REM THIS ADD
   S THE HEADINGS WITH RETURNS
CS 1380 ? #4;CHR$(13);"MONTH","PAYMENT","
   INTEREST","AMOUNT";CHR$(13):RETURN
HL 1390 ? #4;MON,PMT$,I$,BAL$:RETURN
IL 1400 ? #4;LINE$:RETURN
KE 1410 ? #4;CHR$(13);YEAR$;" INTEREST=";
   C;"    PRIN=";B:? #4;"CHARGES= ";M:RET
   URN
ZU 1420 REM *** ERROR ROUTINE ***
JB 1430 ? "[illegible]":? :? "INPUT MISTAKE - START
    OVER":FOR I=1 TO 100:NEXT I:GOTO 80
CJ 1440 REM ***CONVERT ROUTINE ***
RA 1450 INPUT AMT
ZT 1460 AMT$=STR$(INT(AMT*100)):IF LEN(AM
   T$)>6 THEN 1530
ID 1470 IF AMT=0 THEN MNY$="    0.00":GOT
   O 1580
YI 1480 D=LEN(AMT$):DOL=INT(AMT)
UH 1490 MNY$="    0.00":MNY$(6,7)=AMT$(D-1
   ,D):IF INT(AMT)=0 THEN 1580
CO 1500 MNY$(7-D,4)=STR$(DOL):GOTO 1580
TI 1510 REM *** CONVERT LARGE ***
QT 1520 INPUT AMT
AC 1530 AMT$=STR$(INT(AMT*100))
RA 1540 IF AMT=0 THEN MNY$="       0.00":G
   OTO 1580
YB 1550 D=LEN(AMT$):DOL=INT(AMT)
YT 1560 MNY$="       0.00":MNY$(9,10)=AMT$
   (D-1,D):IF INT(AMT)=0 THEN MNY$(7,8)="
   0.":GOTO 1580
GU 1570 MNY$(10-D,7)=STR$(DOL)
BH 1580 RETURN
```

QUIZ MASTER

YOUR ATARI GETS YOU READY FOR THOSE DREADED SHORT-ANSWER TESTS *Article on page 13*

Article on page 13

LISTING 1

Don't type the TYPO II Codes!

```
JI 2 REM QUIZ MASTER
MQ 4 REM BY ERIC TUCKER
YS 6 REM (c)1990, ANTIC PUBLISHING, INC.
BX 10 P1=1:P2=P1+P1:P3=P2+P1:P4=P2+P2:P5=
   P3+P2:P6=P3+P3:P7=P3+P4:P8=P6+P2:P9=P2
   +P7:K1=P9+P1:K2=K1*K1:K3=K2*K1
UM 20 P752=752:P710=P752-P6*P7:P712=P710+
   P2:P82=P8*K1+P2:P16=P4*P4:MM=K2+P3*P5:
   GC=K2*K2:PROMPT=GC+P5:CONFIRM=GC+K1
XZ 25 P195=P2*K2-P5:CONVERT=P6*P8*K2:FQA=
   CONVERT-K2:GFN=GC-K3
BO 30 DIM CLS$(K1*P2+P8),QST$(P16*P8),ANS
   $(K2+P16),CNT$(P5*K1+P5),Q$(P1),CV$(P3
   ):CLS$="[illegible]"
DH 40 CNT$="[illegible]":Q$=CHR$(P1
   6+P16+P2)
DK 45 DIM ERS$(P4*K1),SRCH$(K1*P7+P5),GAN
   S$(K2+P16),FIND$(P8*K1+P3):ERS$="[illegible]"
VK 50 FIND$="[illegible]"
PU 80 SRCH$="[illegible]"
YX 81 DIM PB1$(P3),PB2$(P3),PU1$(P3),PU2$
   (P3),PC1$(P3),PC2$(P3):FOR T=1 TO 3:RE
   AD A:PB1$(T)=CHR$(A):NEXT T
PQ 82 FOR T=1 TO 3:READ A:PB2$(T)=CHR$(A)
   :NEXT T:FOR T=1 TO 3:READ A:PU1$(T)=CH
   R$(A):NEXT T:FOR T=1 TO 3:READ A
WU 83 PU2$(T)=CHR$(A):NEXT T:FOR T=1 TO 3
   :READ A:PC1$(T)=CHR$(A):NEXT T:FOR T=1
    TO 3:READ A:PC2$(T)=CHR$(A):NEXT T
XH 84 DATA 27,69,155
TI 85 DATA 27,70,155
QB 86 DATA 27,45,49
PN 87 DATA 27,45,48
CJ 88 DATA 15,155,155
DP 89 DATA 18,155,155
LR 90 LIMIT=FRE(ZR)-P16*P8:DIM DAT$(LIMIT
   ):OPEN #P1,P4,ZR,"K:"
YM 100 POKE K1*P8+P2,P2:GRAPHICS ZR:POKE
   559,ZR:? "    [illegible]"
ID 110 ? "     Quiz Master -- By Eric Tuck
   er ":? "    [illegible]"
IW 115 POKE P710,P2:POKE P712,P2:T=USR(AD
   R(CLS$)):POKE P82,P2:POSITION P2,P4:?
   "Select option:"
UA 120 ? "[illegible]":POKE P82,P3:? "[illegible]
   ":? "A - Add new entries":? "L - Load
   file from disk"
EU 130 ? "S - Save file to disk":? "E - E
   dit file":? "B - Browse thru file":? "
   T - Test yourself"
OJ 140 ? "P - Printout study sheet":? "I
   - Index of disk files":? "C - Clear me
   mory":? "Q - Quit program"
KB 150 POKE P82,P2:? :? "Memory used: ";L
   EN(DAT$);" bytes":? "Memory left: ";LI
   MIT-LEN(DAT$);" bytes":POKE P752,P1
AF 160 ? "Number of entries: ";E:? INT(10
   0*LEN(DAT$)/LIMIT+P1/P2);"% of memory
   in use":POKE 559,P3*K1+P4
CW 170 POKE P752+P6+P6,P16*P16-P1:GOSUB G
   C:IF A=K1*P6+P5 THEN GOTO K3
ED 172 IF A=K1*P7+P6 THEN GOTO K3*P2
GB 174 IF A=K1*P8+P3 AND DAT$<>"" THEN GO
   TO P5*P5*K2
XP 176 IF A=K1*P6+P9 AND DAT$<>"" THEN GO
   TO K3*P3
XQ 178 IF A=K1*P6+P6 AND DAT$<>"" THEN GO
   TO K3*P4
YI 180 IF A=K1*P8+P4 AND DAT$<>"" THEN GO
   TO K3*P5
```

```
EH 190 IF A=K1*P8 AND DAT$<>"" THEN GOTO K3*P6
IR 192 IF A=K1*P7+P3 THEN GOTO K3*P7
FB 194 IF A=K1*P6+P7 AND DAT$<>"" THEN GOTO K3*P8
AA 196 IF A=K1*P8+P1 THEN 8500
UK 198 ? "⊠↑":GOTO K2+P7*K1
MZ 1000 T=USR(ADR(CLS$)):POKE P710,P16*P9:POKE P712,P16*P9:POSITION P2,P5:? "↑↑↑↑↑↑↑↑↑↑↑↑↑↑"
EN 1003 POSITION P2,P6+P7:? "ENTER BLANK TO RETURN TO MAIN MENU"
JR 1006 ? :? "please limit entries to two lines;":? "otherwise they will be truncated"
FA 1010 POKE P752,ZR:POSITION P2,P4:? " QUESTION ":POKE P82,P4:? :INPUT #16,QST$:POKE P82,P2
CS 1015 IF QST$="" THEN GOTO MM
PS 1020 ? :? " ANSWER ":POKE P82,P4:? :INPUT #16,ANS$:POKE P82,P2:IF ANS$="" THEN GOTO MM
LQ 1030 POKE P82,P1:POKE P752,P1:? "↓↓↓↓↓↑↑↑↑↑↑Is the above information correct? (y/n)":POKE P82,P2
CQ 1040 GOSUB CONFIRM+P5:IF A THEN GOTO K3+P8*K1
JT 1060 T=USR(ADR(CLS$)):POSITION P2,P8:? " ENTRY NOT ADDED!! ⊠":? :GOSUB PROMPT:GOTO K3
UW 1080 ANS$=ANS$(P1,P7*K1+P1-(P7*K1+P1-LEN(ANS$))*(LEN(ANS$)<P7*K1+P1)):IF DAT$<>"" THEN DAT$(LEN(DAT$)+P1)="♥"
DC 1085 QST$=QST$(P1,P7*K1+P1-(P7*K1+P1-LEN(QST$))*(LEN(QST$)<P7*K1+P1))
EF 1090 DAT$(LEN(DAT$)+P1)=QST$:DAT$(LEN(DAT$)+P1)="◘":DAT$(LEN(DAT$)+P1)=ANS$:E=E+P1:GOTO K3
HA 2000 T=USR(ADR(CLS$)):POKE P710,P8*K1:POKE P712,P8*K1:POKE P82,P2
JW 2005 POSITION P2,P8:? "ENTER BLANK TO RETURN TO MENU"
DP 2010 POSITION P2,P4:? "Load file from disk":? "□□□□□□□□□□□□□□□□□□□□□□":POKE P752,ZR:POKE K2*P7+P2,P16*P4
EJ 2020 POKE P7*K2-P6,ZR:? "Filename: ";:GOSUB GFN
TA 2050 TRAP 2053:POKE 752,P1:? "↑":CLOSE #P2:OPEN #P2,P4,ZR,QST$:TRAP 2080:GOTO 2060
OJ 2053 ? "↓↑↑↑↑I/O ERROR!!⊠  (number ";PEEK(P195);")":GOSUB PROMPT:GOTO P2*K3
OF 2060 IF DAT$="" THEN 2069
MV 2061 T=P7:? "↓↑Overwrite resident file? (y/n)"
NZ 2062 GOSUB GC:IF A=K1*P8+P9 THEN DAT$="":? "↑↑O";:GOTO 2068
QP 2064 IF A=P7*K1+P8 THEN DAT$(LEN(DAT$)+P1)=CHR$(ZR):? "↑↑Do not o";:GOTO 2068
BC 2066 ? "⊠↑":GOTO 2062
GF 2068 ? "verwrite resident file"
OF 2069 ? :? "↑";:GOSUB CONFIRM:IF  NOT A THEN CLOSE #P2:GOTO K3*P2
XR 2074 ? "↑↑↑";:IF T=P7 THEN ? "↑↑";:T=ZR
ZR 2076 ? "Loading ";Q$;QST$;Q$;" from disk..."
QU 2078 INPUT #P2,QST$:DAT$(LEN(DAT$)+P1)=QST$:GOTO 2078
UD 2080 CLOSE #P2:E=USR(ADR(CNT$),ADR(DAT$),LEN(DAT$)-P1):? "↓Loading job complete          ":GOSUB PROMPT:GOTO MM
HK 2500 T=USR(ADR(CLS$)):POKE P710,P8*K1:POKE P712,P8*K1:POKE P82,P2
KG 2505 POSITION P2,P8:? "ENTER BLANK TO RETURN TO MENU"
MX 2510 POSITION P2,P4:? "Save file to disk":? "□□□□□□□□□□□□□□□□□□□□□":POKE P752,ZR:POKE K2*P7+P2,P16*P4
ZI 2520 POKE P7*K1-P6,ZR:? "Filename: ";:GOSUB GFN:POKE P752,P1
NO 2550 TRAP 2590:? "↓↑↑↑Saving ";Q$;QST$;Q$;" to disk...":CLOSE #P2:OPEN #P2,P8,ZR,QST$
IU 2560 A=INT(LEN(DAT$)/127)-P1:IF LEN(DAT$)>126 THEN FOR T=ZR TO A:? #P2;DAT$(T*127+1,T*127+P16*P8-P1):NEXT T
AP 2570 IF LEN(DAT$)/127<>INT(LEN(DAT$)/127) THEN ? #P2;DAT$(A*127+P16*P8,LEN(DAT$))
HQ 2580 CLOSE #P2:? :? "File saved":GOSUB PROMPT:GOTO MM
ZL 2590 IF PEEK(195)=170 THEN 2560
GM 2600 ? "↓↑↑↑↑I/O ERROR!!⊠  (number ";PEEK(P195);")":CLOSE #P2
TQ 2610 GOSUB PROMPT:GOTO P5*P5*K2
MI 3000 T=USR(ADR(CLS$)):POKE P710,P16*P9:POKE 712,P16*P9:POSITION P2,P4:? "Edit file":? "□□□□□□□□□□"
JM 3010 ? "Enter a one-line search string:":POKE P752,ZR:? "↓↓↓Enter blank to return to menu↑↑↑"
RT 3020 INPUT #P16,QST$:IF QST$="" THEN GOTO MM
YB 3030 POKE P752,P1:? "↓↑↑↑↑↑↑↑Searching...";:FOR T=P1 TO LEN(QST$):A=ASC(QST$(T)):IF A>P256/P2 THEN A=A-P256/P2
TZ 3040 IF A>P16*P6 AND A<P16*P8-P5 THEN A=A-P8*P4
HF 3050 QST$(T,T)=CHR$(A):NEXT T:O=ZR
FU 3060 M=USR(ADR(FIND$),ADR(DAT$)+O,LEN(DAT$)+ADR(DAT$),ADR(QST$),LEN(QST$)):IF M THEN 3080
GG 3070 ? "↑Search string not found":GOSUB PROMPT:GOTO MM
SZ 3080 M=M+P1-ADR(DAT$):C1=M:C2=M
EZ 3090 C1=C1-P1:IF  NOT C1 THEN 3100
TZ 3095 IF DAT$(C1,C1)<>"♥" AND DAT$(C1,C1)<>"◘" THEN 3090
QQ 3100 C2=C2+P1:IF C2>LEN(DAT$) THEN 3110
GN 3105 IF DAT$(C2,C2)<>"♥" AND DAT$(C2,C2)<>"◘" THEN 3100
XF 3110 C3=C2:IF C2>LEN(DAT$) THEN 3130
SU 3111 IF DAT$(C2,C2)="♥" THEN 3130
WQ 3120 C3=C3+P1:IF C3>LEN(DAT$) THEN 3140
PF 3125 IF DAT$(C3,C3)<>"♥" THEN 3120
RI 3127 GOTO 3140
KX 3130 C2=C1
KF 3135 C1=C1-P1:IF  NOT C1 THEN 3140
UX 3137 IF DAT$(C1,C1)<>"♥" THEN 3135
US 3140 ? "↑ QUESTION ":POKE P82,P4:?
ZJ 3145 ? DAT$(C1+P1,C2-P1):POKE P82,P2:? "↓↑↑ ANSWER ":POKE P82,P4:? :? DAT$(C2+P1,C3-P1):POKE P82,P2:? "↑"
PA 3150 ? "↓ F  Find string again":? " E  Edit this entry"
ML 3160 ? " D  Delete this entry":? " R  Return to main menu"
DA 3161 GOSUB GC:IF A=P6*K1+P9 THEN 3250
HJ 3162 IF A=P7*K1 THEN O=C3:FOR T=P16+P7 TO P6 STEP -P1:POSITION P2,T:? "↑";:NEXT T:GOSUB GC+K1*P3:GOTO 3060
ID 3164 IF A=P8*P8+P4 THEN 3200
XR 3166 IF A=P8*K1+P2 THEN GOTO MM
PA 3168 ? "⊠";:GOTO 3161
UQ 3200 POKE P710,P16*P3:POKE P712,P16*P3:? "↑↑↑↑↑↑↑↑DELETE THIS ENTRY↓":GOSUB CONFIRM
OE 3201 POKE P710,P16*P9:POKE P712,P16*P9:? "↑↑↑↑↑↑":IF  NOT A THEN 3150
WD 3202 GOSUB 3203:GOTO 3210
MD 3203 IF E=P1 THEN DAT$="":RETURN
II 3204 IF C1=ZR THEN DAT$(P1)=DAT$(C3+P1):RETURN
RK 3206 IF C3>LEN(DAT$) THEN DAT$(C1)="":RETURN
HZ 3208 DAT$(C1)=DAT$(C3):RETURN
MQ 3210 IF DAT$="" THEN E=ZR:? "↑↑↑↑↑↑↑↑":GOSUB PROMPT:GOTO MM
NK 3213 E=E-P1:? "↓ ENTRY DELETED!! ⊠"
MY 3216 ? "↓ F  Find string again":? " R  Return to main menu"
NU 3220 GOSUB GC:IF A=P8*K1+P2 THEN GOTO MM
IU 3230 IF A=P7*K1 THEN 3162
KM 3240 ? "⊠";:GOTO 3220
EU 3250 ? "↑↑↑↑↑↑↑↑Make desired changes, then press <RET>":POKE P82,P4:POSITION P4,P8:POKE P752,ZR
VR 3255 ? "↓↓";:INPUT #P16,QST$
KH 3260 ? "↓↓":INPUT #P16,ANS$
HP 3270 POKE P752,P1:POKE P82,P2:? "↓↑Is this O.K.? (y/n)"
UG 3273 GOSUB GC:IF A=P7*K1+P8 THEN GOTO MM
NH 3276 IF A<>P8*K1+P9 THEN ? "⊠";:GOTO 3273
ZS 3280 GOSUB 3203:DAT$(LEN(DAT$)+P1)="♥":DAT$(LEN(DAT$)+P1)=QST$:DAT$(LEN(DAT$)+P1)="◘"
IE 3290 DAT$(LEN(DAT$)+P1)=ANS$:GOTO MM
KH 4000 POKE P710,242:POKE P712,242:T=USR(ADR(CLS$)):POSITION P2,P4:? "Browse thru file":? "□□□□□□□□□□□□□□□□□□"
XE 4005 ? "↓↓Press <ESC> to return to menu":? "↑↑↑Show Question or Answer first? (Q/A)"
NX 4010 GOSUB GC:IF A=P2*K1+P7 THEN GOTO MM
WT 4015 IF A<>P6*K1+P5 AND A<>P9*P9 THEN ? "⊠↑":GOTO K3*P4+K1
NQ 4020 ? "↓↑":M=(A=P9*P9):? "↑↑↑↑Show ";:IF M THEN ? "question";:GOTO 4040
QA 4030 ? "answer";
RK 4040 ? " first":? "↓You want auto answer cover? (Y/N)"
ZI 4050 GOSUB CONFIRM+P5
ZR 4060 AC=A:? "↑↑";:IF  NOT AC THEN ? "Do not c";:GOTO 4080
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QL 4070 ? "C";
HL 4080 ? "over answers automatically":?
   :GOSUB P9*P5*K2:? :GOSUB CONFIRM:IF  N
   OT A THEN GOTO MM
MP 4090 T=USR(ADR(CLS$)):EN=P1:? "▣▣":CV$
   ="▣▣▣"
XP 4100 POKE P82,ZR:POSITION ZR,P3:? "Q1:
   ":? "▣▣A1:":? "▣▣Q2:":? "▣▣A2:":? "▣▣Q
   3:":? "▣▣A3:":GOSUB 4600
BB 4110 POKE P82,P1:POSITION P1,P2*K1+P3:
   ? "▣Options: <  >  ▣▣  ▣▣  1  2  3  J
    H  ▣▣▣":POKE P710+P16+P6,ZR
KT 4113 POKE P82,P4:POSITION P1,P16+P5:?
   "Now starting with entry #";EN
CI 4114 IF PEEK(P710+P16+P6)=P16+P1 THEN
   POKE 764,57
LI 4117 IF PEEK(764)=P16*P16-P1 THEN 4114
GU 4120 GOSUB GC:T=4140:IF A=P2*K1+P7 THE
   N GOTO T
XR 4122 IF A=P6*K1 AND EN>P1 THEN GOTO T+
   K1
BS 4124 IF A=P6*K1+P2 AND EN<E-P2 THEN GO
   TO T+K1*P2
RS 4126 IF (A=P3*K1 OR A=P4*K1+P3) AND EN
   >P1 THEN GOTO T+K1*P3
YD 4128 IF (A=P3*K1+P1 OR A=P4*K1+P2) AND
    EN<E-P2 THEN GOTO T+K1*P4
QL 4130 IF A<P5*K1+P2 AND A>P16*P3 THEN G
   OTO T+K1*P6
PH 4132 IF A=P7*K1+P2 THEN GOTO T+P5*K1
XM 4134 IF A=P7*K1+P4 AND E>P3 THEN GOTO
   T+K2
AH 4138 ? "▣▣":GOTO 4113
RB 4140 POKE P82,P1:POSITION P1,P2*K1+P3:
   ? "▣Return to main menu? (Y/N)";
BC 4142 GOSUB CONFIRM+P5:IF A THEN GOTO M
   M
QB 4144 GOTO 4110
SS 4150 EN=EN-P3:IF EN<P1 THEN EN=P1
AH 4151 IF AC THEN CV$="▣▣▣"
AG 4152 GOSUB 4600:GOTO 4113
CM 4160 EN=EN+P3:IF EN>E-P2 THEN EN=E-P2
AK 4161 IF AC THEN CV$="▣▣▣"
QI 4162 GOTO T+P2+K1
TA 4170 EN=EN-P1:IF AC THEN CV$="▣▣▣"
UT 4175 GOTO K1+P2+T
SH 4180 EN=EN+P1:IF AC THEN CV$="▣▣▣"
UW 4185 GOTO K1+P2+T
AR 4190 A=USR(ADR(CLS$)):POSITION P2,P4:G
   OSUB P9*P5*K2:GOSUB PROMPT:A=USR(ADR(C
   LS$)):GOTO 4100
AX 4200 T=A-P16*P3:IF T+EN-P1>E THEN 4138
YL 4205 A=USR(ADR(ERS$),T*P6-P2):A=USR(AD
   R(ERS$),T*P6-P2):A=P1-ASC(CV$(T)):CV$(
   T,T)=CHR$(A)
BU 4210 IF A THEN T=T+EN-P1:GOSUB FQA:GOS
   UB CONVERT+K2
RO 4215 GOTO 4113
JF 4240 POSITION P2,P16+P7:POKE P752,ZR:P
   OKE P82,P1:? "▣▣▣▣Jump to what entry?
   (1-";E-P2;") ";
TJ 4241 TRAP T+K2:INPUT #P16,EN
RG 4242 IF EN<P1 OR EN>E-P2 OR EN<>INT(EN
   ) THEN GOTO T+K2
AS 4244 IF AC THEN CV$="▣▣▣"
VV 4246 POKE P752,P1:? "▣▣";:GOSUB FQA-K2
   :GOTO 4110
FP 4500 ? "Keystrokes and their functions
   :":POKE P82,P4:? :? "<  Scroll backwar
   d three entries"
NF 4510 ? ">  Scroll forward three entrie
   s":? "▣▣  Scroll backward one entry":?
    "▣▣  Scroll forward one entry"
PI 4520 QST$="  Toggle answer cover of en
   try #":FOR T=P1 TO P3:? T;QST$;T:NEXT
   T
ST 4525 ? "J  Jump to specified entry":?
   "H  Help with keystroke functions"
TX 4530 ? "▣▣  Escape to main menu":POKE
   P82,P2:RETURN
WP 4600 FOR T=P1 TO P16 STEP P3:A=USR(ADR
   (ERS$),T):NEXT T:POKE P82,P4
RD 4605 FOR T=EN TO EN+(EN<E)+(E-EN>P1)
JN 4610 GOSUB FQA:POSITION P4,P3+P6*(T-EN
   ):IF LEN(QST$)<P6*P6 THEN ? QST$:GOTO
   4640
ZH 4620 ? QST$(P1,P5*P7):A=ASC(QST$(P6*P6
   )):GOSUB CONVERT:POKE 40159+P6*P4*K1*(
   T-EN),A
AW 4630 IF LEN(QST$)>P6*P6 THEN ? QST$(P6
   *P6+P1,LEN(QST$))
DF 4640 IF  NOT ASC(CV$(T-EN+P1)) THEN 46
   70
FD 4650 GOSUB CONVERT+K2
LY 4670 NEXT T:RETURN
CB 4700 IF T=P1 THEN C1=P1:GOTO 4720
AS 4710 C1=USR(ADR(SRCH$),ADR(DAT$),T-P1,
   ZR)+P2
AU 4720 C2=USR(ADR(SRCH$),ADR(DAT$),T,P1)
   :C3=USR(ADR(SRCH$),ADR(DAT$),T,ZR)
BP 4730 IF T=E THEN C3=LEN(DAT$)
KO 4740 IF M THEN QST$=DAT$(C1,C2):ANS$=D
   AT$(C2+P2,C3):RETURN
NA 4750 QST$=DAT$(C2+P2,C3):ANS$=DAT$(C1,
   C2):RETURN
IT 4800 DONE=CONVERT+K1*P4:IF A<P8*P4 THE
   N GOTO DONE
HS 4805 IF A<P16*P6 THEN GOTO DONE+P5
JI 4810 IF A<P16*P8 THEN RETURN
MC 4815 IF A<P16*K1 THEN GOTO DONE
PO 4820 IF A<224 THEN GOTO DONE+P5
BB 4830 RETURN
IT 4840 A=A+P16*P4:RETURN
MW 4845 A=A-P8*P4:RETURN
TM 4900 POSITION P4,P6+P6*(T-EN):IF LEN(A
   NS$)<P6*P6 THEN ? ANS$:RETURN
AX 4910 ? ANS$(P1,P5*P7):A=ASC(ANS$(P6*P6
   )):GOSUB CONVERT:POKE 40279+P6*P4*K1*(
   T-EN),A
XU 4920 IF LEN(ANS$)>P6*P6 THEN ? ANS$(P6
   *P6+P1,LEN(ANS$))
BD 4930 RETURN
ZX 4980 FOR C3=P1 TO P3:FOR C2=P1 TO P4:N
   EXT C2:SOUND ZR,A,T,P7
BJ 4982 FOR C2=P1 TO P9*P2:NEXT C2:SOUND
   ZR,A,A,ZR:NEXT C3:RETURN
KO 5000 POKE P710,P16*P6:POKE P712,P16*P6
   :POKE P82,P1:T=USR(ADR(CLS$))
WZ 5005 POSITION P1,P4:? "Test knowledge
   of this file"
AT 5010 ? "□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□":?
   "▣▣File will be destroyed while test
   ing▣▣▣":C=ZR:W=ZR
EW 5015 GOSUB CONFIRM:IF  NOT A THEN ? :G
   OTO MM
JQ 5020 ? "▣▣▣▣▣Test in order? (Y/N)":GOS
   UB CONFIRM+P5:O=A:? "▣▣";:IF O THEN ?
   "T";:GOTO 5040
SF 5030 ? "Do not t";
RR 5040 ? "est in order":? :? "Give quest
   ion or answer as hint? (Q/A)"
DN 5050 GOSUB GC:IF A<>P6*K1+P5 AND A<>P9
   *P9 THEN ? "▣▣":GOTO 5050
ZX 5060 M=(A=P9*P9):? "▣▣Give ";:IF M THE
   N ? "question";:GOTO 5080
QN 5070 ? "answer";
BW 5080 ? " as hint":? :? "Accept answers
    with Uuser approval or  Verbatim (exa
   ctly as entered)? (U/V)"
RC 5090 GOSUB GC:IF A<>P8*K1+P5 AND A<>P8
   *K1+P6 THEN ? "▣▣":GOTO 5090
BC 5100 AC=(A=P8*K1+P6):? "▣▣Accept ";:IF
    AC THEN ? "verbatim answers only":GOT
   O 5120
LS 5110 ? "user approved answers"
TR 5120 ? :? "To what file should I save
   questions":? "that you answer incorrec
   tly?":POKE P752,ZR:? :GOSUB GFN
KD 5125 POKE P752,P1:? "▣▣▣▣▣▣▣Save quest
   ions answered incorrectly":? "under th
   e filename ";Q$;QST$;Q$
XS 5130 ? :GOSUB CONFIRM:? "▣":IF  NOT A
   THEN GOTO MM
EX 5140 T=USR(ADR(CLS$)):CLOSE #P2:TRAP 5
   142:XIO P6*P6,#P2,ZR,ZR,QST$
ES 5142 OPEN #P2,P8,ZR,QST$:POSITION P2,K
   1+K1+P3
DY 5145 ? "CORRECT: 0  WRONG: 0  PERCENT:
   none";
TZ 5150 TRAP 40000:EN=P1:IF  NOT O THEN E
   N=INT(RND(ZR)*E)+P1
OD 5153 T=EN:GOSUB FQA:POKE P82,P2:POSITI
   ON P2,P4
TJ 5155 ? "▣Question▣":POKE P82,P4:? :IF
   LEN(QST$)<P6*P6 THEN ? QST$:GOTO 5165
AS 5160 ? QST$(P1,P5*P7):A=ASC(QST$(P6*P6
   )):GOSUB CONVERT:POKE 40279,A
BE 5162 IF LEN(QST$)>P6*P6 THEN ? QST$(P6
   *P6+P1,LEN(QST$))
DX 5165 POSITION P2,K1+K1:? "Type ";Q$;"<
   MENU>";Q$;" to return to main menu"
MA 5168 POSITION P2,P9:? "▣Answer given:▣
   ":T=P1:GANS$="":POKE P752,ZR:?
EG 5170 GOSUB GC:IF ((A)=P8*P4 AND A<=P16
   *P8-P4) OR (A)=P16*K1 AND A<=P16*P16-P
   4)) AND T<P7*K1 THEN 5210
AI 5180 IF A=P16*P8-P2 AND T>P1 THEN 5230
RF 5190 IF A=P16*K1-P5 THEN 5250
SN 5200 GOTO 5170
IS 5210 GANS$(T)=CHR$(A):T=T+P1:? CHR$(A)
   ;:IF PEEK(P82+P3)>P4*K1-P3 THEN POSITI
   ON P4,K1+P2:? "▣▣";
ST 5220 GOTO 5170
OW 5230 T=T-P1:GANS$(T,T)=" ":IF PEEK(P82
   +P3)=P4 THEN POSITION P4*K1-P1,K1+P1:?
    "▣";
PX 5240 ? CHR$(A);:GOTO 5170
QW 5250 IF GANS$="<MENU>" THEN CLOSE #P2:
   GOTO MM
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NH 5251 IF E=P1 THEN DAT$="":GOTO 5254
TI 5252 IF EN=E THEN DAT$(C1-P1)="":GOTO 5254
OZ 5253 DAT$(C1)=DAT$(C3+P2)
QV 5254 E=E-P1
EJ 5255 POKE P752,P1:POSITION P2,P7+P7:? " Correct answer  ":POKE P82,P4:? :IF LEN(ANS$)<P6*P6 THEN ? ANS$:GOTO 5280
EQ 5260 ? ANS$(P1,P5*P7):A=ASC(ANS$(P6*P6)):GOSUB CONVERT:POKE 40679,A
XW 5270 IF LEN(ANS$)>P6*P6 THEN ? ANS$(P6*P6+P1,LEN(ANS$))
JF 5280 IF GANS$="" THEN GANS$="□"
RS 5282 T=LEN(ANS$):IF LEN(GANS$)<LEN(ANS$) THEN T=LEN(GANS$)
CJ 5285 POSITION P2,K1+K1:POKE P82,P2:C1=(GANS$(P1,T)=ANS$):IF AC THEN 5300
SQ 5290 POKE P82,P1:? "■":? "Did you give the correct answer? (Y/N)";:GOSUB CONFIRM+P5:C1=A:POSITION P1,P2*K1
EX 5300 POKE P82,P2:? "                                ■■":? "■";:C=C+P1:IF  NOT C1 THEN ? "■■";:C=C-P1:W=W+P1
UQ 5320 ? "CORRECT!  ":FOR C3=P1 TO P3:FOR C2=P1 TO P3:NEXT C2
ZP 5330 SOUND ZR,P4*K1-C1*K1,P6+P4*C1,P4:FOR C2=P1 TO P7*P2:NEXT C2:SOUND ZR,ZR,ZR,ZR:NEXT C3
GI 5332 IF C1 THEN 5340
RF 5334 IF W>P1 THEN ? #P2;"■";
OL 5335 IF  NOT M THEN GANS$=QST$:QST$=ANS$:ANS$=GANS$
XB 5336 ? #P2;QST$:? #2;"■";ANS$
DG 5340 GOSUB 5370:POSITION P7+P8-P2*C1,K1*P2:? "press any key":GOSUB GC:T=USR(ADR(CLS$))
MK 5350 GOSUB 5370:IF E THEN 5150
CJ 5360 CLOSE #P2:POSITION P2,P4:? "That's all the questions!":GOSUB PROMPT:GOTO MM
HH 5370 POSITION P1,K1+K1+P3:? "■CORRECT: ";C;"  WRONG: ";W;"  PERCENT: ";INT(100*C/(C+W));"%";:RETURN
MT 6000 T=USR(ADR(CLS$)):POKE P710,242:POKE P712,242
WM 6005 POSITION P2,P4:? "Printout study sheet":? "□□□□□□□□□□□□□□□□□□□□□□□□"
CX 6010 ? "■■■■ENTER BLANK TO RETURN TO MENU":? "■■■■■■Enter a two-line title:":? :INPUT #P16,ANS$:CLOSE #P2
UK 6011 IF ANS$="" THEN GOTO MM
WK 6012 ? "■Regular or Condensed print? (R/C)"
UL 6014 GOSUB GC:IF A<>P6*K1+P7 AND A<>P8*K1+P2 THEN ? "■■":GOTO 6014
RH 6016 M=P4*K1+24*(A=P6*K1+P7):T=ZR
BG 6020 ? "■■";:IF M=P4*K1 THEN ? "Regular";:GOTO 6024
PW 6022 ? "Condensed";
OV 6024 ? " print":? :GOSUB CONFIRM:IF  NOT A THEN GOTO MM
KJ 6026 ? "■Printing...":TRAP 6110:OPEN #P2,P8,ZR,"P:":IF M=P6*K1+P4 THEN ? #P2;PC1$
RF 6028 ? #P2;PB1$;PU1$;ANS$;PB2$;PU2$:? #P2
JJ 6040 IF E<P2 THEN 6080
JT 6050 FOR T=P1 TO E:GOSUB FQA
WQ 6052 ANS$=ANS$(P1,M-P1-(M-P1-LEN(ANS$))*(LEN(ANS$)<M-P1))
ZU 6054 QST$=QST$(P1,M-P1-(M-P1-LEN(QST$))*(LEN(QST$)<M-P1)):? #2;QST$;
FK 6060 QST$="":FOR A=1 TO M+P1+C1-C2:QST$(A,A)=" ":NEXT A
UN 6070 ? #2;QST$;ANS$:NEXT T
QP 6090 ? #2;PC2$:? #2:? #2
AM 6100 ? "■■Print job finished!!■":GOSUB PROMPT:GOTO MM
GS 6110 ? "■■Printer not responding!!■":CLOSE #P2:GOSUB PROMPT:GOTO MM
HR 7000 T=USR(ADR(CLS$)):POKE P710,192:POKE P712,192:POSITION P2,P4:? "Index of disk files":? "□□□□□□□□□□□□□□□□□□□□□□□□"
ES 7010 ? "■■Press <RET> for ";Q$;"D1:*.*";Q$:? "■Press <ESC> to return to menu"
CL 7020 POKE P752,ZR:? "■■■■■■Filespec: ";:POKE P752+P6+P6,P16*P16-P1
YV 7030 IF PEEK(P752+P6+P6)=P16*P16-P1 THEN 7030
RH 7040 IF PEEK(P752+P6+P6)=28 THEN GOSUB GC:GOTO MM
HT 7050 INPUT #P16,ANS$:POKE P752,P1:IF ANS$="" THEN ANS$="D:*.*"
NY 7060 IF LEN(ANS$)>2 THEN IF ANS$(P2,P2)=":" OR ANS$(P3,P3)=":" THEN QST$=ANS$:GOTO 7080
BQ 7070 QST$="D:":QST$(3)=ANS$
QG 7080 ? "■■■■■■■■■■■■Filespec: ";Q$;QST$;Q$:CLOSE #P2:TRAP 7120:OPEN #P2,P6,ZR,QST$:TRAP 7100:?
LJ 7090 INPUT #P2,ANS$:? ANS$;"  ";:INPUT #P2,ANS$:? ANS$:GOTO 7090
WZ 7100 IF PEEK(85)>K1 THEN ?
AU 7110 GOSUB PROMPT:GOTO K2
EL 7120 ? "■■I/O ERROR!!■  (number ";PEEK(P195);")":GOSUB PROMPT:GOTO P7*K3
MF 8000 POKE P710,P16*P3:POKE P712,P16*P3:T=USR(ADR(CLS$)):POSITION P2,P4:? "CLEAR MEMORY":? "□□□□□□□□□□□□□□"
EF 8010 GOSUB CONFIRM:IF  NOT A THEN ? :GOTO MM
MS 8030 T=USR(ADR(CLS$)):? :? "■■■MEMORY CLEARED!!■":DAT$="":E=ZR:GOSUB PROMPT:GOTO MM
IH 8500 POKE P710,P16*P3:POKE P712,P16*P3:T=USR(ADR(CLS$)):POSITION P2,P4:? "QUIT PROGRAM":? "□□□□□□□□□□□□□□"
EP 8510 GOSUB CONFIRM:IF  NOT A THEN ? :GOTO MM
JD 8520 POKE P710,P2:POKE P712,P2:POKE P82,P1:POKE P7*K2-P6,ZR:POKE K2*P7+P2,P16*P4
DM 8530 POKE P710-P1,P2:POSITION ZR,ZR:? "■■■";:T=USR(ADR(CLS$)):POKE P710-P1,K1:POKE P752,ZR:CLR :END
IH 9000 INPUT #P16,ANS$:IF ANS$="" THEN POP :GOTO MM
EL 9010 IF LEN(ANS$)>P2 THEN IF ANS$(P2,P2)=":" OR ANS$(P3,P3)=":" THEN QST$=ANS$:RETURN
SU 9020 QST$="D:":QST$(P3)=ANS$:RETURN
OM 10000 GET #P1,A:A=A-P16*P8*((A>P16*P8) AND (A<>P16*K1-P5)):A=A-P8*P4*((A>K2-P4) AND (A<P16*P8-P5)):RETURN
DI 10005 POKE P752,P1:? :? "Press any key to continue":GOSUB GC:RETURN
YG 10010 ? "Is this OK? (Y/N)";
FG 10015 GOSUB GC:IF A=P7*K1+P8 THEN A=ZR:RETURN
JJ 10020 IF A<>P8*K1+P9 THEN ? "■■":GOTO CONFIRM+P5
VV 10025 A=P1:RETURN
IB 10030 IF C3>LEN(DAT$) THEN POP :GOTO 3070
EI 10035 RETURN
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LISTING 2

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WV 10 REM QUIZ MASTER, LISTING 2
VU 20 REM BY Eric Tucker
GD 30 REM (c) 1985,1988 ANTIC PUBLISHING
EV 40 REM (LINES 10-250 MAY BE USED WITH OTHER BASIC LOADERS IN THIS ISSUE.
IJ 50 REM CHANGE LINE 70 AS NECESSARY.)
PR 60 DIM FN$(20),TEMP$(20),AR$(93):DPL=PEEK(10592):POKE 10592,255
WO 70 FN$="D:LINES.LST":REM THIS IS THE NAME OF THE DISK FILE TO BE CREATED
RD 80 ? "■Disk or Cassette?";:POKE 764,255
PY 90 IF  NOT (PEEK(764)=18 OR PEEK(764)=58) THEN 90
TH 100 IF PEEK(764)=18 THEN FN$="C:"
VB 110 POKE 764,255:GRAPHICS 0:? "      ANTIC'S GENERIC BASIC LOADER"
MY 120 ? ,"BY CHARLES JACKSON"
KB 130 POKE 10592,DPL:TRAP 200
PU 140 ? :? :? "Creating ";FN$:? "...please stand by."
LW 150 RESTORE :READ LN:LM=LN:DIM A$(LN):C=1
BQ 160 AR$="":READ AR$
YC 170 FOR X=1 TO LEN(AR$) STEP 3:POKE 752,255
DM 180 LM=LM-1:POSITION 10,10:? "(Countdown...T-";INT(LM/10);")     "
BK 190 A$(C,C)=CHR$(VAL(AR$(X,X+2))):C=C+1:NEXT X:GOTO 160
MM 200 IF PEEK(195)=5 THEN ? :? :? "■TOO MANY DATA LINES!":? "CANNOT CREATE FILE!":END
CM 210 IF C<LN+1 THEN ? :? "■TOO FEW DATA LINES!":? "CANNOT CREATE FILE!":END
UQ 220 IF FN$="C:" THEN ? :? " Prepare cassette, press [RETURN]"
AR 230 OPEN #1,8,0,FN$
PV 240 POKE 766,1:? #1;A$;:POKE 766,0
AL 250 CLOSE #1:GRAPHICS 0:? " COMPLETED "
LI 1000 DATA 495
CW 1010 DATA 051048032068073077032067076083036040075049042080050043080056041044081083084036040080049054042
DJ 1020 DATA 080056041044065078083036040075050043080049054041044067078084036040080053042075049043080053041
MX 1030 DATA 044081036040080049041044067086036040080051041058067076083036061034
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```
   104169184133212169156133213
OY 1040 DATA 1600001690001452122302122082
   48230213165213201160208240096034155052
   048032067078084036061034104
FF 1050 DATA 1041332151041332141041332171
   04133216169001133212169000133213168177
   214208006230212208002230213
TR 1060 DATA 23021420800022302151982161652
   16201255208232198217165217201255208224
   096034058081036061067072082
UP 1070 DATA 0360400800490540430800490540
   43080050041155052053032068073077032069
   082083036040080052042075049
UQ 1080 DATA 0410440830820670720360400750
   49042080055043080053041044071065078083
   036040075050043080049054041
GV 1090 DATA 0440700730780680360400800560
   42075049043080051041058069082083036061
   034104162020169147133212169
MG 1100 DATA 1561332131041041681652120241
   05040133212165213105000133213136208240
   160076169000145212136208249
UV 1110 DATA 0960341550530480320700730780
   68036061034104104133215104133214104133
   217104133216104133219104133
AC 1120 DATA 2181041041332201600001772140
   41127201097144007201123176003056233032
   209218240025230214208002230
CT 1130 DATA 2151652151972172082231652141
   97216208217169000133212133213096200196
   220208207165214133212165215
IO 1140 DATA 1332130960341550560480320830
   82067072036061034104104133213133217104
   133212133216104133215104133
GJ 1150 DATA 2141041041332181600001772121
   97218240008230212208246230213208242198
   214201255208002198215165214
DS 1160 DATA 2080181652152080141652120562
   29216133212165213229217133213096230212
   208208230213208204034155
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STARFIELD INVASION

FAST-ACTION GAME FEATURING A SPECTACULAR GRAPHICS TECHNIQUE

Article on page 9

LISTING 1

Don't type the TYPO II Codes!

```
CH 2 REM INVASION LOADER
YQ 4 REM (c)1990, ANTIC PUBLISHING, INC.
YM 10 DIM A$(1):GRAPHICS 0:CLOSE #1:RESTO
   RE :? "INVASION Program Saver":? :? "D
   isk or Cassette";:INPUT A$
AR 20 IF A$="D" THEN 50
NF 30 IF A$="C" THEN 140
RL 40 GOTO 10
OV 50 GRAPHICS 0:? "Insert a formatted di
   sk with DOS":? "on which to create the
    INVASION game"
YR 60 ? "as an AUTORUN.SYS file.  Press R
   ETURN":? "when ready";:INPUT A$
HN 70 TRAP 90:OPEN #1,4,0,"D1:AUTORUN.SYS
   ":? "D1:AUTORUN.SYS already exists!":?
    :? "Type Y to overwrite";:INPUT A$
FI 80 IF A$<>"Y" THEN 50
AG 90 CLOSE #1:TRAP 110:OPEN #1,8,0,"D:AU
   TORUN.SYS":? "Saving..."
IU 100 READ A:PUT #1,A:GOTO 100
KJ 110 CLOSE #1:IF PEEK(195)=6 THEN ? "IN
   VASION now saved as D1:AUTORUN.SYS.":?
    "Boot with this disk to play.":END
WS 120 IF PEEK(195)=8 THEN ? "A non-numer
   ic character is in the":? "DATA statem
   ents. Rectify and re-run.":END
UT 130 ? "Error number ";PEEK(195);" has
   occurred.":? "Rectify and re-run.":END

SO 140 GRAPHICS 0
RD 150 ? "Position cassette & depress PLA
   Y and":? "RECORD.  Then hit RETURN.":O
   PEN #1,8,0,"C:":? "Saving..."
CV 160 TRAP 170:READ A:PUT #1,A:GOTO 160
LL 170 CLOSE #1
WB 180 IF PEEK(195)=6 THEN ? "Done. To pl
   ay, run the INVASION":? "Program Loade
   r.":END
GF 190 IF PEEK(195)=8 THEN ? "A non-numer
   ic character is in the":? "DATA statem
   ents. Fix and re-run.":END
JR 200 ? "Error number ";PEEK(195);" occu
   rred.":? "Rectify and re-run.":END
CQ 1000 DATA 255,255,0,31,120,37,169,2,13
   3,9,169,0,133,2,169,31,133,3,169,0,141
   ,68,2,141,12,52,141,13,52
IA 1010 DATA 133,82,141,239,51,169,39,133
   ,83,169,7,32,203,53,169,64,133,16,141,
   14,210,169,66,133,192,141
LF 1020 DATA 131,51,169,54,133,193,141,13
   2,51,160,0,169,222,153,121,37,165,192,
   200,153,121,37,165,193,200
MW 1030 DATA 153,121,37,165,192,24,105,8,
   133,192,165,193,105,0,133,193,200,192,
   72,144,221,169,199,133,192
PE 1040 DATA 169,37,133,193,169,2,141,134
   ,51,169,55,141,135,51,162,0,160,0,185,
   130,51,145,192,200,192,15
UV 1050 DATA 144,246,165,192,24,105,15,13
   3,192,165,193,105,0,133,193,173,131,51
   ,24,105,1,141,131,51,173,132
LP 1060 DATA 51,105,0,141,132,51,173,134,
   51,24,105,1,141,134,51,173,135,51,105,
   0,141,135,51,232,224,192,144
VB 1070 DATA 192,169,3,141,29,208,141,100
   ,50,169,64,141,7,212,169,62,141,47,2,1
   69,1,141,111,2,141,240,2,173
XA 1080 DATA 6,52,141,12,34,169,49,141,35
   ,53,141,75,53,169,14,141,192,2,141,193
   ,2,141,194,2,160,0,152,153
LU 1090 DATA 0,67,153,0,68,153,0,69,153,0
   ,70,200,208,241,162,32,169,128,141,91,
   51,141,90,51,157,0,67,232
CB 1100 DATA 224,224,144,248,162,0,142,12
   9,51,160,0,185,105,51,157,2,55,232,200
   ,192,8,144,244,238,129,51
FP 1110 DATA 173,129,51,201,24,144,232,16
   9,0,141,198,2,170,173,10,210,157,66,54
   ,232,224,192,144,245,173,48
UR 1120 DATA 2,133,192,173,49,2,133,193,1
   60,2,177,192,9,128,145,192,169,147,141
   ,40,2,169,36,141,41,2,169
BC 1130 DATA 194,141,0,2,169,37,141,1,2,1
   62,0,173,10,210,41,127,24,105,60,157,1
   45,51,41,63,157,220,51,41
QU 1140 DATA 3,56,233,1,157,211,51,173,10
   ,210,41,127,24,105,46,157,148,51,41,3,
   56,233,1,240,238,157,214,51
IQ 1150 DATA 169,0,157,217,51,157,240,51,
   169,255,157,223,51,169,5,157,229,51,16
   9,7,157,232,51,157,235,51
TJ 1160 DATA 232,224,3,144,180,173,100,50
   ,10,10,10,141,5,52,169,112,141,198,53,
   169,153,141,199,53,169,0,141
NW 1170 DATA 144,2,141,145,2,141,146,2,17
   0,169,11,141,66,3,169,14,141,68,3,169,
   52,141,69,3,169,158,141,72
IZ 1180 DATA 3,142,73,3,142,255,2,32,86,2
   28,162,0,160,0,136,208,253,202,208,248
   ,142,255,2,173,31,208,201
BX 1190 DATA 7,240,236,201,5,208,3,76,75,
   33,201,3,208,3,76,17,33,201,6,208,218,
   76,135,33,174,12,52,232,224
XG 1200 DATA 3,144,2,162,0,142,12,52,189,
   6,52,141,12,34,169,35,141,145,2,169,0,
   141,146,2,141,144,2,141,72
UN 1210 DATA 3,141,73,3,169,11,141,66,3,2
   32,138,9,48,141,35,53,162,0,32,86,228,
   76,232,32,174,13,52,232,224
EF 1220 DATA 3,144,2,162,0,142,13,52,189,
   9,52,141,100,50,169,35,141,145,2,169,0
   ,141,146,2,141,72,3,141,73
ZS 1230 DATA 3,169,1,141,144,2,169,11,141
   ,66,3,232,138,9,48,141,75,53,162,0,32,
   86,228,76,232,32,162,0,142
CK 1240 DATA 144,2,142,145,2,142,146,2,16
   9,11,141,66,3,169,174,141,68,3,169,52,
   141,69,3,169,158,141,72,3
ZI 1250 DATA 169,0,141,73,3,32,86,228,169
   ,1,141,92,51,141,26,2,169,192,141,14,2
   12,173,15,210,41,4,208,41
PT 1260 DATA 173,9,210,201,33,208,34,32,1
   33,36,173,15,210,41,4,240,249,173,15,2
   10,41,4,208,249,173,9,210
LX 1270 DATA 201,33,208,242,173,15,210,41
   ,4,240,249,32,140,36,169,0,133,77,173,
   16,208,208,3,76,32,35,173
XZ 1280 DATA 5,52,240,3,76,187,33,173,100
   ,50,10,10,10,141,5,52,173,10,210,201,6
   4,176,172,41,3,201,3,240,166
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BX 1290 DATA 170,189,223,51,240,160,48,15
   8,189,240,51,208,153,142,243,51,169,32
   ,141,0,210,169,79,141,1,210
YU 1300 DATA 169,1,157,240,51,169,2,32,2,
   54,174,243,51,189,148,51,56,233,26,74,
   72,168,189,145,51,56,233,45
MM 1310 DATA 72,170,169,0,32,13,54,173,10
   ,210,41,63,24,105,8,168,141,245,51,173
   ,10,210,41,127,24,105,16,170
QQ 1320 DATA 141,244,51,169,0,32,37,54,16
   9,64,141,200,2,141,198,2,169,0,32,2,54
   ,104,170,104,168,169,0,32
LV 1330 DATA 13,54,169,0,174,244,51,172,2
   45,51,32,37,54,174,243,51,169,0,157,24
   0,51,141,0,210,141,1,210,141
EO 1340 DATA 200,2,141,198,2,173,198,53,7
   2,201,2,144,36,32,133,36,248,104,56,23
   3,2,141,198,53,72,216,32,140
YQ 1350 DATA 36,169,36,141,145,2,169,0,14
   1,146,2,141,144,2,104,32,104,36,76,187
   ,33,169,143,141,1,210,141
UK 1360 DATA 239,51,162,128,160,0,173,10,
   210,141,0,210,141,200,2,141,198,2,136,
   208,241,202,208,236,142,0
ZL 1370 DATA 210,142,1,210,142,200,2,142,
   198,2,142,144,2,142,145,2,142,146,2,16
   9,11,141,66,3,169,158,141
BG 1380 DATA 68,3,169,53,141,69,3,169,39,
   141,72,3,142,73,3,32,86,228,76,94,36,1
   69,79,141,1,210,169,1,141
GX 1390 DATA 0,210,141,239,51,32,2,54,169
   ,0,141,30,208,162,80,160,79,32,13,54,1
   73,91,51,56,233,45,72,170
BN 1400 DATA 173,90,51,56,233,26,74,72,16
   8,169,0,32,37,54,169,0,32,2,54,169,0,1
   62,80,160,79,32,13,54,104
EM 1410 DATA 168,104,170,169,0,141,0,210,
   141,1,210,32,37,54,169,0,141,239,51,17
   3,8,208,240,3,32,143,35,173
ML 1420 DATA 9,208,240,3,32,143,35,173,10
   ,208,240,3,32,143,35,76,247,33,44,86,5
   1,240,5,162,0,32,174,35,44
QB 1430 DATA 87,51,240,5,162,1,32,174,35,
   44,88,51,240,5,162,2,32,174,35,96,72,1
   38,72,189,240,51,240,3,104
DX 1440 DATA 104,96,104,72,24,105,68,141,
   209,35,169,1,157,240,51,189,148,51,168
   ,162,0,189,246,51,153,0,255
DV 1450 DATA 232,200,224,12,144,244,104,1
   70,169,60,157,2,52,32,133,36,248,173,1
   99,53,56,233,1,141,199,53
DT 1460 DATA 173,198,53,201,153,240,6,24,
   105,1,141,198,53,216,32,140,36,173,199
   ,53,72,201,3,176,5,169,0,76
NG 1470 DATA 12,36,169,1,157,200,53,104,2
   40,39,160,36,140,145,2,160,0,140,146,2
   ,160,1,140,144,2,32,104,36
YG 1480 DATA 169,36,141,145,2,169,0,141,1
   46,2,141,144,2,173,198,53,32,104,36,10
   4,96,162,0,142,144,2,142,145
SP 1490 DATA 2,142,146,2,169,11,141,66,3,
   169,78,141,68,3,169,53,141,69,3,169,79
   ,141,72,3,142,73,3,32,86,228
PE 1500 DATA 173,31,208,201,6,208,249,76,
   116,228,72,74,74,74,74,32,115,36,104,4
   1,15,9,48,162,11,142,66,3
ZP 1510 DATA 162,0,142,72,3,142,73,3,76,8
   6,228,169,128,141,14,212,120,96,169,19
   2,141,14,212,88,96,169,64
LU 1520 DATA 141,36,2,169,37,141,37,2,169
   ,13,141,34,2,169,49,141,35,2,169,183,1
   41,40,2,169,36,141,41,2,169
QG 1530 DATA 1,141,26,2,96,169,0,141,255,
   2,238,196,2,173,5,52,240,3,206,5,52,16
   2,2,189,2,52,240,15,222,2
BR 1540 DATA 52,240,19,169,32,141,2,210,1
   69,15,141,3,210,202,16,233,169,1,141,2
   6,2,96,138,72,24,105,68,141
FP 1550 DATA 253,36,189,148,51,168,169,0,
   141,2,210,141,3,210,170,153,0,255,232,
   200,224,12,144,247,104,170
XK 1560 DATA 173,10,210,41,127,24,105,60,
   157,145,51,173,10,210,41,127,24,105,46
   ,157,148,51,169,255,157,223
UO 1570 DATA 51,169,0,141,30,208,169,5,15
   7,229,51,169,7,157,235,51,157,232,51,1
   89,200,53,240,5,169,0,157
KE 1580 DATA 240,51,76,221,36,238,113,51,
   238,114,51,238,115,51,238,116,51,238,1
   17,51,238,118,51,238,119,51
RQ 1590 DATA 238,120,51,162,0,189,113,51,
   221,121,51,144,15,169,0,157,113,51,32,
   121,37,224,1,176,3,32,121
PN 1600 DATA 37,232,224,8,144,228,76,98,2
   28,193,37,198,37,96,72,138,72,152,72,7
   ,49,65,54,104,168,104,170
XF 1610 DATA 104,64,173,239,51,240,3,76,1
   54,49,162,1,169,15,56,237,120,2,44,86,
   51,240,16,172,90,51,192,32
LS 1620 DATA 144,9,206,90,51,206,90,51,14
   2,92,51,44,87,51,240,16,172,90,51,192,
   182,176,9,238,90,51,238,90
GL 1630 DATA 51,142,92,51,44,88,51,240,13
   ,172,91,51,192,50,144,6,206,91,51,206,
   91,51,44,89,51,240,13,172
DZ 1640 DATA 91,51,192,201,176,6,238,91,5
   1,238,91,51,174,91,51,142,4,208,232,23
   2,142,5,208,232,232,142,6
FC 1650 DATA 208,173,92,51,240,26,169,0,1
   41,92,51,170,172,90,51,185,0,67,41,192
   ,29,93,51,153,0,67,232,200
PN 1660 DATA 224,12,144,239,169,0,141,238
   ,51,133,192,169,68,133,193,174,238,51,
   189,240,51,240,3,76,187,50
FU 1670 DATA 222,235,51,240,3,76,187,50,1
   89,232,51,157,235,51,189,223,51,240,5,
   48,94,76,115,50,141,129,51
VJ 1680 DATA 189,229,51,201,5,176,37,10,2
   4,125,229,51,10,10,188,148,51,170,189,
   151,51,145,192,232,200,238
AG 1690 DATA 129,51,173,129,51,201,12,144
   ,239,174,238,51,254,229,51,76,187,50,1
   69,255,157,223,51,189,148
NG 1700 DATA 51,24,105,5,157,148,51,168,1
   69,0,145,192,173,10,210,41,127,24,105,
   60,157,145,51,173,10,210,41
YQ 1710 DATA 127,24,105,46,157,148,51,76,
   187,50,222,229,51,48,48,189,229,51,10,
   24,125,229,51,10,10,188,148
QH 1720 DATA 51,170,169,0,141,129,51,189,
   151,51,145,192,232,200,238,129,51,173,
   129,51,201,12,144,239,174
JF 1730 DATA 238,51,189,145,51,157,0,208,
   76,187,50,173,10,210,41,7,24,105,4,157
   ,226,51,169,1,157,235,51,157
OP 1740 DATA 232,51,169,1,157,223,51,76,1
   87,50,189,145,51,24,125,211,51,157,145
   ,51,201,48,144,76,201,201
MS 1750 DATA 176,72,189,148,51,24,125,214
   ,51,157,148,51,201,186,176,58,201,33,1
   44,54,254,217,51,189,217,51
TH 1760 DATA 221,220,51,176,43,188,148,51
   ,162,0,189,151,51,145,192,200,232,224,
   12,144,245,174,238,51,189
VK 1770 DATA 145,51,157,0,208,230,193,238
   ,238,51,174,238,51,224,3,176,3,76,168,
   49,76,95,228,189,148,51,56
FA 1780 DATA 253,214,51,157,148,51,189,14
   5,51,56,253,211,51,157,145,51,254,223,
   51,189,223,51,221,226,51,144
OO 1790 DATA 19,169,0,157,223,51,157,229,
   51,169,7,157,235,51,157,232,51,76,187,
   50,169,0,157,217,51,173,10
YF 1800 DATA 210,41,63,157,220,51,189,145
   ,51,16,12,48,19,189,148,51,16,23,48,30
   ,76,162,50,32,65,51,157,211
BX 1810 DATA 51,76,19,51,32,73,51,157,211
   ,51,76,19,51,32,65,51,157,214,51,76,16
   2,50,32,73,51,157,214,51,76
OZ 1820 DATA 162,50,173,10,210,41,3,240,2
   49,96,173,10,210,41,3,240,249,73,255,2
   4,105,1,96,1,2,4,8,0,0,0,0
OI 1830 DATA 0,12,12,12,63,63,12,12,12,0,
   0,14,12,10,8,8,6,4,2,0,0,0,0,0,0,0,1
   ,1,2,3,4,6,9,14,0,173,66,54
UT 1840 DATA 172,2,55,141,10,212,141,7,20
   8,140,21,208,0,0,0,0,0,0,0,0,0,146,1
   86,254,198,0,0,0,0,0,0,0
GF 1850 DATA 146,254,198,0,0,0,0,0,0,0,0,
   0,84,124,68,0,0,0,0,0,0,0,0,0,56,0,0
   ,0,0,0,0,0,0,0,0,0,16,0,0
HO 1860 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,
   0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,
   0,0,0,0,0,0,20,64,10,160,4
RE 1870 DATA 17,132,33,4,80,2,40,0,0,0,0,
   64,128,192,3,2,1,0,0,32,32,32,32,160,1
   60,160,160,201,206,214,193
TC 1880 DATA 211,201,207,206,160,160,160,
   160,32,32,79,80,84,73,79,78,45,76,101,
   118,101,108,58,49,32,32,32
CP 1890 DATA 32,32,32,32,32,160,160,160,1
   60,141,141,141,141,141,141,141,141,160
   ,160,160,160,32,32,83,69,76
FN 1900 DATA 69,67,84,45,83,112,101,101,1
   00,58,49,32,32,32,32,32,32,32,32,160,2
   26,249,186,160,206,239,242
OR 1910 DATA 237,225,238,160,204,233,238,
   160,32,32,83,84,65,82,84,32,45,80,108,
   97,121,32,71,97,109,101,32
MY 1920 DATA 32,32,32,32,32,160,160,160,1
   60,168,227,169,160,177,185,184,184,160
   ,160,160,160,32,32,83,80,65
PI 1930 DATA 67,69,32,45,80,97,117,115,10
   1,32,32,32,32,32,32,32,32,32,160,16
   0,160,160,201,206,214,193
DO 1940 DATA 211,201,207,206,160,160,160,
   160,32,32,83,104,105,101,108,100,32,69
   ,110,101,114,103,121,58,55
JD 1950 DATA 48,32,32,32,32,32,32,160,160
   ,160,160,141,141,141,141,141,141,141,1
   41,160,160,160,160,32,32,69
ID 1960 DATA 110,101,109,105,101,115,32,7
```

```
   6,101,102,116,32,58,57,57,32,32,32,32,
   32,32,160,226,249,186,160
SQ 1970 DATA 206,239,242,237,225,238,160,
   204,233,238,160,32,32,76,101,118,101,1
   08,32,78,117,109,98,101,114
KM 1980 DATA 32,58,32,49,32,32,32,32,32,3
   2,160,160,160,160,168,227,169,160,177,
   185,184,184,160,160,160,160
GM 1990 DATA 32,32,69,110,101,109,121,32,
   83,112,101,101,100,32,32,58,32,49,32,3
   2,32,32,32,32,160,160,160
XK 2000 DATA 160,201,206,214,193,211,201,
   207,206,160,160,160,160,32,32,199,207,
   207,196,160,202,207,194,161
HO 2010 DATA 217,207,213,160,215,201,206,
   161,32,32,32,32,32,160,160,160,160,141
   ,141,141,141,141,141,141,141
FW 2020 DATA 160,160,160,160,32,32,173,17
   3,190,208,210,197,211,211,160,211,212,
   193,210,212,188,173,173,32
BE 2030 DATA 32,32,32,32,160,160,160,160,
   201,206,214,193,211,201,207,206,160,16
   0,160,160,89,79,85,32,76,79
MS 2040 DATA 83,69,45,80,85,83,72,32,83,8
   4,65,82,84,32,0,0,0,0,0,72,162,96,169,
   12,157,66,3,32,86,228,169
YQ 2050 DATA 3,157,66,3,169,64,157,68,3,1
   69,54,157,69,3,169,1,157,72,3,169,0,15
   7,73,3,104,72,73,16,41,16
ZH 2060 DATA 24,105,12,157,74,3,104,157,7
   5,3,76,86,228,141,65,54,96,132,84,134,
   85,133,86,96,32,6,54,162,96
MN 2070 DATA 169,11,157,66,3,169,0,157,72
   ,3,157,73,3,173,65,54,76,86,228,32,6,5
   4,162,96,169,17,157,66,3,169
FX 2080 DATA 0,157,72,3,157,73,3,173,65,5
   4,141,251,2,76,86,228,83,0,224,2,225,2
   ,0,31
```

LISTING 2

```
OR 2 REM INVASION CASSETTE LOADER
YQ 4 REM (c)1990, ANTIC PUBLISHING, INC.
WF 10 GRAPHICS 0:CLOSE #1:? "INVASION Pro
   gram Loader":? :? "Insert the cassette
    which contains"
MZ 20 ? "the data from the INVASION Progr
   am":? "Saver.  Position the cassette a
   nd":? "press PLAY.  Then hit RETURN."
VQ 30 TRAP 80:OPEN #1,4,0,"C:":? "Loading
   ...":GET #1,A:GET #1,A
ZQ 40 GET #1,L:GET #1,H:ST=L+256*H
IN 50 GET #1,L:GET #1,H:EN=L+256*H
AY 60 FOR I=ST TO EN:GET #1,A:POKE I,A:NE
   XT I
SP 70 GOTO 40
IM 80 CLOSE #1:IF PEEK(195)=136 THEN A=US
   R(7936)
NZ 90 ? "Error number ";PEEK(195);" occur
   red":? "during load. Try again.":END
```

NUCLEAR REACTOR

CLEANING UP AFTER A MELTDOWN CAN GET TRICKY

Article on page 16

LISTING 1

Don't type the TYPO II Codes!

```
LF 10 REM NUCLEAR REACTOR
RE 20 REM BY Dennis Debro
LA 30 REM (c)1990, ANTIC PUBLISHING, INC.

BF 80 REM
KV 90 GRAPHICS 17:POKE 559,0:CHSET=(PEEK(
   106)-8)*256:Z=USR(ADR("hh▮Lh▮Kh▮Nh▮M▮▮
   ▮▮1KrM/PyfLfNJPP▮"),57344,CHSET)
OU 100 READ A:IF A<0 THEN 120
PG 110 FOR J=0 TO 7:READ B:POKE CHSET+A*8
   +J,B:NEXT J:GOTO 100
PK 120 DIM X$(32),X(5),Y(5),SC$(6),LVL$(2
   )
SM 130 X=10:Y=12:SC=0:T=25:LVL=1:L=3:SL=1
   0:QW=1:X$="hhhH▮9▮ ▮ Re▮▮▮P▮▮T/PrJPMh8
   iBPd▮":M=1:NS=10:NS2=NS:GOTO 600
SB 135 GOSUB 1200
AR 140 GRAPHICS 17:POKE 756,CHSET/256:POK
   E 19,0:SCR=PEEK(88)+256*PEEK(89):POKE
   708,12:POKE 709,38:POKE 710,196
UE 150 POKE 711,52:FOR I=SCR+40 TO SCR+59
   :POKE I,193:POKE I+420,194:NEXT I
VQ 160 FOR I=SCR+60 TO SCR+440 STEP 20:PO
   KE I,195:POKE I+19,196:NEXT I:FOR I=1
   TO (10+M)*2:X1=INT(RND(0)*18)+1
VS 170 Y1=INT(RND(0)*20)+3:POSITION X1,Y1
   :? #6;"▮";:FOR W=1 TO 255 STEP 20:SOUN
   D 0,W,8,10:NEXT W:SOUND 0,0,0,0
EE 175 NEXT I:IF M>5 THEN M=5
FY 180 FOR I=1 TO M:X(I)=INT(RND(0)*18)+1
   :Y(I)=INT(RND(0)*20)+3:NEXT I:FOR I=1
   TO M:P=SCR+X(I)+20*Y(I):POKE P,134
QF 185 NEXT I:FOR I=1 TO (10+M)*2:X1=INT(
   RND(0)*18)+1:Y1=INT(RND(0)*20)+3:POSIT
   ION X1,Y1:? #6;"▮";
AC 186 FOR W=14 TO 0 STEP -2:SOUND 0,10,1
   0,W:NEXT W:NEXT I
YI 190 POSITION 0,0:? #6;"score 000000 li
   ves 0":POSITION 0,1:? #6;" level 00  t
   ime 25"
PI 200 SC$=STR$(SC):POSITION 12-LEN(SC$),
   0:? #6;SC$:POSITION 19,0:? #6;L:LVL$=S
   TR$(LVL):POSITION 9-LEN(LVL$),1
ZQ 210 ? #6;LVL$:FOR I=1 TO NS:X1=INT(RND
   (0)*18)+1:Y1=INT(RND(0)*20)+3:IF (X1<>
   X) OR (Y1<>Y) THEN 221
AE 220 X1=INT(RND(0)*18)+1:Y1=INT(RND(0)*
   20)+3:GOTO 230
QP 221 FOR T=1 TO M:IF (X1<>X(T)) OR (Y1<
   >Y(T)) THEN 223
AK 222 X1=INT(RND(0)*18)+1:Y1=INT(RND(0)*
   20)+3:GOTO 230
KL 223 NEXT T
UH 230 POSITION X1,Y1:? #6;"%";:FOR W=14
   TO 0 STEP -2:SOUND 0,W*5,10,W:NEXT W:N
   EXT I
JS 240 SOUND 0,254,10,10:SOUND 1,255,10,1
   0:FOR I=10 TO 0 STEP -1:SOUND 0,254,10
   ,I:SOUND 1,255,10,I
OK 245 A=USR(ADR(X$),1):NEXT I
FY 250 FOR I=1 TO M:P=SCR+X(I)+20*Y(I):PO
   KE P,134:NEXT I:TP=SCR+X+20*Y:ST=PEEK(
   632):POKE TP,ST:IF NS2<=0 THEN 490
JX 255 POKE 77,0
PZ 260 X=X+(ST=7)-(ST=11):Y=Y+(ST=13)-(ST
   =14):IF (ST=10) OR (ST=6) OR (ST=5) OR
    (ST=9) THEN 290
LA 270 IF ST<>15 THEN POKE TP,0:SOUND 1,1
   28,8,14:SOUND 1,0,0,0:GOTO 300
WN 280 SOUND 1,0,0,0
YM 290 ST=15:POKE TP,ST:SOUND 1,0,0,0
YD 300 LOCATE X,Y,Z:IF (Z<>32) AND (Z<>47
   ) AND (Z<>37) AND (Z<>9) THEN 410
IU 310 IF INT(SC/20000)=QW AND BONUS=1 TH
   EN GOSUB 570:BONUS=0:QW=QW+1
VX 315 IF Z=9 THEN SC=SC+250:GOSUB 652:SC
   $=STR$(SC):POSITION 12-LEN(SC$),0:? #6
   ;SC$:BONUS=1
ZS 320 IF Z=37 THEN SC=SC+100:NS2=NS2-1:G
   OSUB 540:SC$=STR$(SC):POSITION 12-LEN(
   SC$),0:? #6;SC$:BONUS=1
YC 330 IF T<=0 THEN T=0:GOTO 410
QH 340 T=25-PEEK(19):POSITION 16,1:? #6;T
   ;" "
BJ 350 R=INT(RND(1)*SL)+1:IF R>M THEN 250

SR 360 P=SCR+X(R)+20*Y(R):X(R)=X(R)+(X>X(
   R))-(X<X(R)):Y(R)=Y(R)+(Y>Y(R))-(Y<Y(R
   )):SOUND 2,250,10,10:SOUND 2,0,0,0
VW 370 LOCATE X(R),Y(R),W:IF W=37 THEN PO
   KE P,5:GOTO 390
SK 380 POKE P,0
FN 390 IF (X(R)=X) AND (Y(R)=Y) THEN 410
NW 400 GOTO 250
KJ 410 FOR I=1 TO 255 STEP 5:SOUND 1,I,8,
   10:POKE 708,I:POKE 709,I:POKE 710,I:NE
   XT I:SOUND 1,0,0,0:L=L-1
FA 420 POKE 708,12:POKE 709,38:POKE 710,1
   96:POSITION 19,0:? #6;L:IF L<>0 THEN X
   =10:Y=12:T=25:NS2=NS:GOTO 135
PF 430 POSITION 5,12:? #6;"game over":RES
   TORE 1080:FOR I=1 TO 11:READ DA,H:SOUN
   D 0,0,0,0
FP 440 SOUND 1,0,0,0:SOUND 0,DA,10,10:SOU
   ND 1,DA-1,10,10:FOR S=1 TO H*2:A=USR(A
   DR(X$),1):NEXT S:NEXT I
FQ 450 SOUND 0,0,0,0:SOUND 1,0,0,0:IF SC>
   =HS THEN HS=SC
EM 460 A=USR(ADR(X$),1):IF (PEEK(53279)=6
   ) OR (STRIG(0)=0) THEN 130
CH 470 C=C+1:IF C=100 THEN C=0:GOTO 600
PR 480 GOTO 460
```

```
SA 490 SC=SC+(INT(T+LVL)*10):IF SC>999999
      THEN SC=0:POSITION 6,0:? #6;"000000"
JH 495 POSITION 3,11:? #6;"LEVEL COMPLETE
   ":POSITION 2,12:? #6;"congratulations
   "
WT 496 SC$=STR$(SC):POSITION 12-LEN(SC$),
   0:? #6;SC$
VR 500 RESTORE 1070:FOR I=1 TO 12:READ DA
   ,BS,H:SOUND 0,DA,10,10
GZ 510 SOUND 1,BS,10,8:FOR S=1 TO H*2:NEX
   T S:SOUND 0,0,0,0:SOUND 1,0,0,0:NEXT I
   :X=10:Y=12:T=25:LVL=LVL+1
PA 515 IF LVL>99 THEN LVL=1
RP 520 NS=NS+1:IF NS>15 THEN NS=15
YX 525 NS2=NS:IF L>5 THEN SL=SL-1:IF SL<5
    THEN SL=5
JG 530 M=M+1:FOR I=1 TO 100:NEXT I:GOTO 1
   35
VP 540 FOR I=14 TO 0 STEP -2:SOUND 0,I*5,
   10,I:NEXT I
NF 550 IF SC>=999999 THEN SC=0:POSITION 0
   ,1:? #6;"000000"
ZN 560 RETURN
GH 570 IF L<5 THEN FOR FD=1 TO 3:FOR I=15
    TO 0 STEP -1:SOUND 0,20,10,I:FOR D=1
   TO 2:NEXT D:NEXT I:NEXT FD
JA 580 IF L<5 THEN L=L+1:BONUS=0:POSITION
    19,0:? #6;L
RT 590 SOUND 0,0,0,0:RETURN
JJ 600 GRAPHICS 17:POKE 756,CHSET/256:DL=
   PEEK(560)+256*PEEK(561)+4:POKE DL-1,71
   :FOR I=2 TO 5:POKE DL+I,7:NEXT I
BW 610 POKE 708,12:POKE 709,38:POSITION 2
   ,4:? #6;"nuclear reactor":POSITION 2,5
   :? #6;"by dennis debro"
LF 615 FOR I=1 TO 25:SOUND 0,254,10,10:SO
   UND 1,255,10,10:A=USR(ADR(X$),1):NEXT
   I
JX 616 FOR I=10 TO 0 STEP -1:SOUND 0,254,
   10,I:SOUND 1,255,10,I:A=USR(ADR(X$),1)
   :NEXT I
CN 620 POSITION 1,10:? #6;"TOP SCORE 0000
   00":POSITION 0,16:? #6;"press START to
    begin"
IA 625 POSITION 17-LEN(STR$(HS)),10:? #6;
   HS
EH 630 A=USR(ADR(X$),1):IF PEEK(53279)<>6
    AND STRIG(0)<>0 THEN 630
FO 650 X=10:Y=12:SC=0:T=25:LVL=1:L=3:SL=1
   0:QW=1:X$="hhhH 9  Re PNT/PrJPMh8
   iHPd ":M=1:NS=10:NS2=NS:GOTO 135
LV 652 FOR I=15 TO 0 STEP -1:SOUND 0,20,1
   0,I:NEXT I:RETURN
SY 660 DATA 1,0,0,0,0,0,0,255,255
EQ 670 DATA 2,255,255,0,0,0,0,0,0
EO 680 DATA 3,128,128,128,128,128,128,128
   ,128
YW 690 DATA 4,1,1,1,1,1,1,1,1
FU 700 DATA 5,60,36,36,66,129,255,255,126
ME 710 DATA 6,126,189,219,255,36,90,66,16
   5
JN 720 DATA 7,24,16,60,88,60,24,36,102
NF 730 DATA 8,255,255,255,255,255,255,255
   ,255
ED 735 DATA 9,60,126,118,98,110,98,118,60
BV 740 DATA 11,24,8,60,26,60,24,36,102
RH 750 DATA 13,24,24,60,90,60,24,36,102
RU 760 DATA 14,24,24,60,90,60,24,36,102
SH 770 DATA 15,24,24,60,90,60,24,36,102
CW 780 DATA 16,0,127,99,99,99,99,99,127
WJ 790 DATA 17,0,56,24,24,24,62,62,62
AJ 800 DATA 18,0,127,3,3,127,96,96,127
OW 810 DATA 19,0,126,6,6,127,7,7,127
WF 820 DATA 20,0,112,112,112,112,119,127,
   7
QY 830 DATA 21,0,127,96,96,127,3,3,127
UR 840 DATA 22,0,124,108,96,127,99,99,127
WC 850 DATA 23,0,127,3,3,31,24,24,24
YB 860 DATA 24,0,62,54,54,127,119,119,127
FI 870 DATA 25,0,127,99,99,127,7,7,7
CI 875 DATA 26,0,56,56,24,24,0,24,24
FW 880 DATA 33,0,63,51,51,127,115,115,115
OJ 890 DATA 34,0,126,102,102,127,103,103,
   127
PH 900 DATA 35,0,127,103,103,96,99,99,127
IO 910 DATA 36,0,126,102,102,119,119,119,
   127
OJ 920 DATA 37,0,127,96,96,127,112,112,12
   7
KL 930 DATA 39,0,127,99,96,111,103,103,12
   7
PA 940 DATA 41,0,127,28,28,28,28,28,127
HM 950 DATA 44,0,48,48,48,112,112,112,126
PU 960 DATA 45,0,103,127,127,119,103,103,
   103
IF 970 DATA 46,0,103,119,127,111,103,103,
   103
OC 980 DATA 47,0,127,99,99,103,103,103,12
   7
LS 990 DATA 48,0,127,99,99,127,112,112,11
   2
JV 1000 DATA 50,0,126,102,102,127,119,119
   ,119
LU 1010 DATA 51,0,127,96,127,3,115,115,12
   7
TC 1020 DATA 52,0,127,28,28,28,28,28,28
IF 1030 DATA 53,0,103,103,103,103,103,103
   ,127
PB 1040 DATA 54,0,103,103,103,103,111,62,
   28
MX 1050 DATA 57,0,103,103,103,127,28,28,2
   8
EW 1060 DATA -1
EY 1070 DATA 64,162,25,64,162,25,64,162,2
   5,64,162,30,72,182,20,72,182,25,72,182
   ,30,81,193,20,81,193,20,81,193,20
II 1075 DATA 81,193,20,64,217,30
BQ 1080 DATA 108,3,108,2,108,1,108,3
KZ 1090 DATA 91,2,96,1,96,2,108,1
UE 1100 DATA 108,2,114,1,108,3
WW 1200 GRAPHICS 18:POKE 708,70:POKE 712,
   14
TR 1210 FOR I=1 TO 5:POSITION 5,5:? #6;"G
   ET READY!"
LV 1220 FOR W=15 TO 0 STEP -1:SOUND 0,20,
   10,W:NEXT W:POSITION 5,5:? #6;"
      ":FOR W=0 TO 15:NEXT W
GK 1230 NEXT I:RETURN
```

LISTING 2

```
HI 10 REM NUCLEAR REACTOR, LISTING 2
RE 20 REM BY Dennis Debro
GD 30 REM (c) 1985,1988 ANTIC PUBLISHING
EV 40 REM (LINES 10-250 MAY BE USED WITH
   OTHER BASIC LOADERS IN THIS ISSUE.
IJ 50 REM CHANGE LINE 70 AS NECESSARY.)
PR 60 DIM FN$(20),TEMP$(20),AR$(93):DPL=P
   EEK(10592):POKE 10592,255
WO 70 FN$="D:LINES.LST":REM THIS IS THE N
   AME OF THE DISK FILE TO BE CREATED
RD 80 ? "}Disk or Cassette?";:POKE 764,25
   5
PY 90 IF  NOT (PEEK(764)=18 OR PEEK(764)=
   58) THEN 90
TH 100 IF PEEK(764)=18 THEN FN$="C:"
VB 110 POKE 764,255:GRAPHICS 0:?"       AN
   TIC'S GENERIC BASIC LOADER"
MY 120 ? ,"BY CHARLES JACKSON"
KB 130 POKE 10592,DPL:TRAP 200
PU 140 ? :? :? "Creating ";FN$:? "...plea
   se stand by."
LW 150 RESTORE :READ LN:LM=LN:DIM A$(LN):
   C=1
BQ 160 AR$="":READ AR$
YC 170 FOR X=1 TO LEN(AR$) STEP 3:POKE 75
   2,255
DM 180 LM=LM-1:POSITION 10,10:? "(Countdo
   wn...T-";INT(LM/10);")      "
BK 190 A$(C,C)=CHR$(VAL(AR$(X,X+2))):C=C+
   1:NEXT X:GOTO 160
MM 200 IF PEEK(195)=5 THEN ? :? :? "TOO
   MANY DATA LINES!":? "CANNOT CREATE FIL
   E!":END
CM 210 IF C<LN+1 THEN ? :? "TOO FEW DATA
    LINES!":? "CANNOT CREATE FILE!":END
UQ 220 IF FN$="C:" THEN ? :? " Prepare ca
   ssette, press [RETURN]"
AR 230 OPEN #1,8,0,FN$
PV 240 POKE 766,1:? #1;A$;:POKE 766,0
AL 250 CLOSE #1:GRAPHICS 0:? " COMPLETED 
   "
IH 1000 DATA 218
QD 1010 DATA 0570480320710820650800720730
   6708303204905505808007907506903205305З
   057044048058067072083069084
WM 1020 DATA 0610400800690690750400490480
   54041045056041042050053054058090061085
   0830820400065068082040034104
ES 1030 DATA 1041332041041332031041332061
   04133205162002160000177203145205136208
   249230204230206202208240096
ND 1040 DATA 0340410440530550510520520440
   67072083069084041155049051048032088061
   049048058089061049050058083
AF 1050 DATA 0670610480580840610500530580
   76086076061049058076061051058083076061
   049048058081087061049058088
UD 1060 DATA 0360610341041041040721620571
   60032173032210101020141025208141010212
   136208242202208237104056233
RK 1070 DATA 0012082280960340580770610490
   58078083061049048058078083050061078083
   058071079084079032054048048
JD 1080 DATA 155
```

Which DOS?
By Donald Seay

Sometimes it can be helpful to know which DOS you booted with. With one or two PEEKs from BASIC you can easily find out. Use this table to determine the DOS version:

PEEK( )	Value Returned	DOS Version
3889	0	SpartaDOS 2.3e
	13	DOS 4.0
	15	SpartaDOS 1.1
	19	Atari DOS 2.5
	76	Atari DOS 3.0
	78	Atari DOS 3.0
	89	SpartaDOS 3.2d
	108	MYDOS 4.0
	207	OSS OS/A+ 4.00
	221	MYDOS 4.50
	238	Atari DOS 2.0S
	238	OSS DOS XL 2.3
	244	Atari DOS XE
1804	0	OSS DOS XL 2.3
	124	Atari DOS 2.0S

Just type PRINT PEEK (3889) [RETURN] at the READY prompt in BASIC, and compare the number printed on your screen with this chart. Note that Atari DOS 3.0 may return either a value of 76 or 78 at location 3889. Both Atari DOS 2.0S and OSS DOS XL 2.3 show a value of 238 at location 3889. To distinguish between the two, check location 1804.

Text In Graphics 8 Mode
By Walter Fritz

Printing text on the screen in Graphics 8 mode is sometimes difficult to achieve. While Atari BASIC does not have an immediate function to put text on the graphics screen, BASIC can be coaxed to write text to the screen by using POKE commands.

This subroutine by Walter Fritz of Glendale, Wisconsin can be put into your programs that need to write text on the Graphics 8 screen. The only thing you must keep in mind is to DIMension TEXT$ to 128, or to whatever number you need for your program's purposes. Also DIMension 'C$' to 1. To use this subroutine just GOSUB to line 1000. Then use TEXT$ to define the text that you want to write to the screen. (You can also print the special character set to screen.)

The text can be placed anywhere on the screen by putting in values for C and R, respectively the Column and Row where the text should start. When C=0 and R=0 the text would start in the upper left corner. C=20 and R=100 would start the text in the center. Lastly, if C=39 and R=150 then the text goes in the lower right corner.

Don't type the TYPO II Codes!

```
LO 10 REM GR.8 TEXT
YS 20 REM BY: WALTER FRITZ
MW 30 REM DIM TEXT$(128),C$(1) AND
TD 40 REM MAKE SURE TEXT$="(some text)"
ZX 50 REM C=COL NUMBER AND R=ROW NUMBER
OV 55 REM LINES 60 TO 110 CAN BE DELETED
      TO MEET YOUR NEEDS.
DR 60 GRAPHICS 8:SETCOLOR 2,0,0:SETCOLOR
   4,0,0
DU 70 DIM TEXT$(128),C$(1)
LC 80 C=5:R=100
FT 90 TEXT$="GR.8 TEXT CAN BE PRINTED NOW
   !"
QI 100 GOSUB 1000
NS 110 END
BJ 1000 Z1=PEEK(88)+PEEK(89)*256
SU 1010 Z2=Z1+R*40+C
RG 1020 FOR ZZ=1 TO LEN(TEXT$)
PU 1030 C$=TEXT$(ZZ,ZZ)
YK 1040 GOSUB 1120
BW 1050 Z3=57344+C*8
EF 1060 FOR U=0 TO 7
IQ 1070 POKE Z2+U*40,PEEK(Z3+U)
KP 1080 NEXT U
NX 1090 Z2=Z2+1
BK 1100 NEXT ZZ
AE 1110 RETURN
LH 1120 C=ASC(C$)
OC 1130 IF C>127 THEN C=C-128
UA 1140 IF C>31 THEN C=C-32:RETURN
MI 1150 IF C<32 THEN C=C+64
AT 1160 RETURN
```

Installing DOS
By Eric Anderson

To put DOS on a non-DOS disk from BASIC, simply open a file called DOS.SYS for output, and then close it. The DOS you booted with will be written to the disk, and you can now boot with that disk. You won't be able to get a DOS menu from it — that part of the operating system is contained in the file DUP.SYS, which must be copied separately.

The following commands to install DOS on drive 1 work with Atari DOS 2.0 and 2.5 and MYDOS, and quite possibly with other operating systems too:

```
100 OPEN #1,8,0,"D1:DOS.SYS"
110 CLOSE #1
```

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ALAN REEVE

By Bill Pike

Reeve Software's Diamond Operating System Cartridge (June 1989 Antic cover story) brought a mouse-operated graphic interface to the 8-bit Atari, complete with windows and drop-down menus. On this page is a small part of a lengthy interview that took place when Alan Reeve attended a Special Meeting of the Portland Atari Club (PAC). Interviewers were PAC Special Projects Director David Moore nd PAC President Bill Pike. The rest of the interview will be published in a forthcoming Antic issue.

A Coming Attraction From: Antic's Exclusive Interview with the creator of the Diamond Operating System

Bill: Diamond Paint was quite impressive when you demonstrated it at yesterday's meeting. You seem to have duplicated just about all functions of most ST paint programs, and many more functions than most existing 8-bit programs. Is that a fair assessment?

Alan: I think so. The feature that I like the best is the cut and paste. I haven't seen that on any other 8-bit system. You can cut sections out of a picture and paste them onto another picture. You can even load and save that section as clip-art.

Bill: About how many pages will Diamond Write let you work on in a 48K Atari?

Alan: A 48K machine will be fairly limited, maybe one page (there's not a whole lot of memory in there). In a 64K machine you'll be able to work on about five pages. A 130K machine has 64K of memory available, so you can get 30 or 40 pages. And it includes a Spell Checker.

Bill: You were talking yesterday about the possibility of coming out with multi-font capability on one document.

Alan: You can use multiple styles, you can only use one font but you can have multiple styles of that font on each document.

David: Will the program support graphics files?

Alan: That is one of the limitations of this program. There just isn't enough memory on the 8-bit Atari.

David: Then you could mix and match fonts also?

Alan: The big limitations of the program comes from the memory, fonts take up a lot of memory. I really don't think that the user wants his memory cramped up with a lot of fonts when the text is already limited.

Bill: It appears that Writer is fully implemented and does a lot of stuff that other word processor programs won't do.

Alan: The really nice thing is that you can use the slider bars to go up and down thru your document and you can use the mouse to position the cursor.

UPCOMING APPLICATIONS

Bill: You were saying that you are thinking of putting Reeve Software's NewsStation together for Diamond. Were you also thinking about NewsStation Companion or Publishing Pro?

Alan: Just NewsStation right now. When the NewsStation is done we just might include NewsStation Companion.

Bill: What are your hopes? Some people say the 8-bit computer is dead and others say the 8-bit machine has never been fully utilized. It sounds like Diamond is starting to fully revitalize the 8-bits.

Alan: The Atari 8-bit system is more than powerful enough to handle 90 to 95 percent of most people need. But people usually want the biggest and best...

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